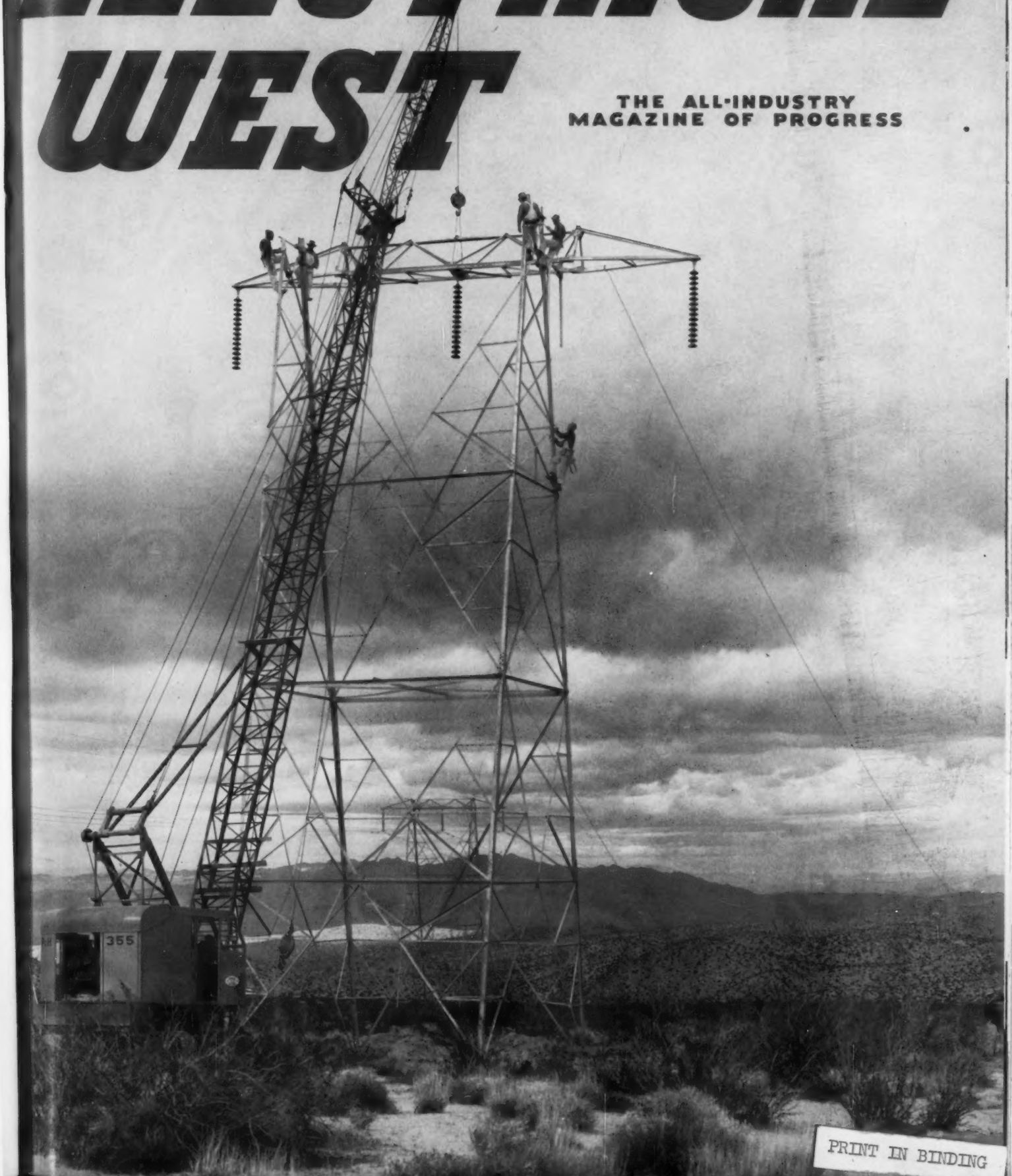
23RD ANNUAL REVIEW & FORECAST • FEBRUARY 1942 • 25c

ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS



PRINT IN BINDING

★ **California's farmers will raise larger crops this year as their contribution to the all-out victory program. This means more mechanical and electrical help—pumps, grinders, hoists, milkers, brooders — more light and power—will be needed for a big job.**

To electrical dealers and contractors serving the farms of this great agricultural territory this is an opportunity for a vital service. You can help with your technical advice—by supplying the needed equipment and service to keep it going.

Bring your knowledge of farm uses of electricity up to date. Learn about the latest developments and improvements. Read the booklet, "*Power on the Farm*", just published by the Edison Farm Electrification Department and now available free to farmers throughout southern and central California. It's yours for the asking. Write for your free copy today. Address Southern California Edison Company, 601 West Fifth Street, Los Angeles.

SOUTHERN CALIFORNIA
ALL-WINTER SUN FESTIVAL

SOUTHERN CALIFORNIA Edison EDISON COMPANY LTD.

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), February, 1942. Vol. 88. No. 2. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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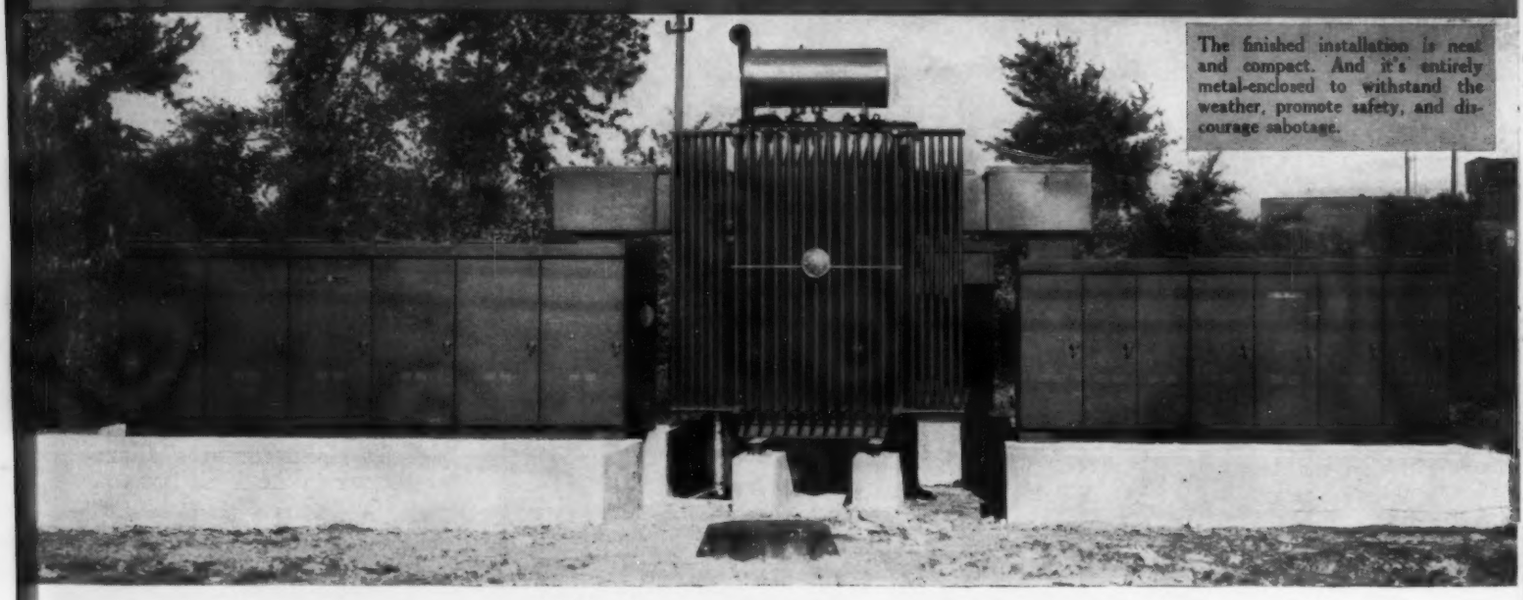
How to Supply Today's Loads with AN EYE ON TOMORROW

Even large unit substations (such as this 3000 kva unit for the Board of Public Utilities of Jamestown, N. Y.) are easily and quickly installed—and at lower over-all cost than that of old style, permanent substations. The completely assembled sections (properly co-ordinated) need merely be skidded into position and bolted together. Then make the necessary connections and your unit substation is ready for service.



The finished installation is neat and compact. And it's entirely metal-enclosed to withstand the weather, promote safety, and discourage sabotage.

EXPAND with UNIT SUBSTATIONS

THEY not only save you installation time, space, and reduce construction requirements; they also provide *flexibility* to meet future changes in load conditions.

A G-E unit substation is delivered in completely factory-assembled, ready-to-install sections; installation is a matter of days rather than weeks. It's compact and designed for outdoor service, making a large investment in real estate and buildings unnecessary. And you can locate it *close to the load center,* so feeders are shorter, losses lower, service better.

Then when load conditions change, it's a comparatively simple matter to move your unit substation to a new load center. In short, here's the practical, farsighted answer to the changing power requirements of *today and tomorrow.* Catalog GEA-2996 or your local G-E representative will give you more information—call or write today. *General Electric Company, Schenectady, N. Y.*

GENERAL ELECTRIC

401-7-170C

Here in the WEST

People

Authors

usually grace this page, but this month the men and women responsible for the accounts of engineering and commercial progress and of the plans and programs for 1942 are too numerous to single out. After all, what is written of 1941 is the fruit of teamwork. In an imperfect world the acme of cooperative action could not well be much superior. And for 1942 this coordinate industry can be expected to unite its efforts for the nation and for a return soon of a free way of life.

Construction

will leap to meet the unprecedented demands of war production. (See pages 44-61.) As capacities previously installed with ample margin for growth are soaked up in new and unexpected war industries, more capacity still is being added and the necessary substation, transmission and distribution facilities to distribute this energy are being projected in step with these new needs. From the Rockies west electricity is in uniform and is exceedingly busy turning the wheels of war industry. Its new war industries are expanding and still newer ones starting, all demanding power.

Sales

in 1941 pushed the ceiling up into a new bulge. If the metals were available to make the appliances, sales in 1942 would go through the roof. But under war conditions a tremendous adjustment has to be made. What the various utilities plan as an aid to that adjustment is reported on pages 62-81.

Contractors-Dealers

will find a concise last minute summary of the restrictions and regulations on appliances and wiring on pages 86-87.

Pages

This Year of War 41
Last year was a year of grace, but the job ahead is a determined one. Its facts are presented here.

Construction for '41 and '42 44
Undreamed of war production demands have absorbed the industry's surplus capacity and more is needed.

Where Do We Go From Here? 62
The sales picture in 1941 was tops until October. What will it be in 1942 with appliance curtailment?

The War and You— 86
Concisely telling of newest restrictions and regulations on appliances and wiring.

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Cover photo is a section of Southern California Edison Co.'s new Boulder dam line across the desert.

Preview

Interconnection

System inter-ties are making news these days as power flows from one system to another in a cooperative program of supplying wartime needs. One such typical interconnection will be discussed from both the engineering and economical aspects in next month's engineering section. It was planned in anticipation of war's requirements and built with speed and precision.

Light Control

Blackouts and their attendant problems of control have focused attention upon the many automatic systems that might be employed for turning on and off the energy that supplies the lights. There will be a discussion of the various control systems with the advantages and disadvantages of each set forth in detail.

Directory

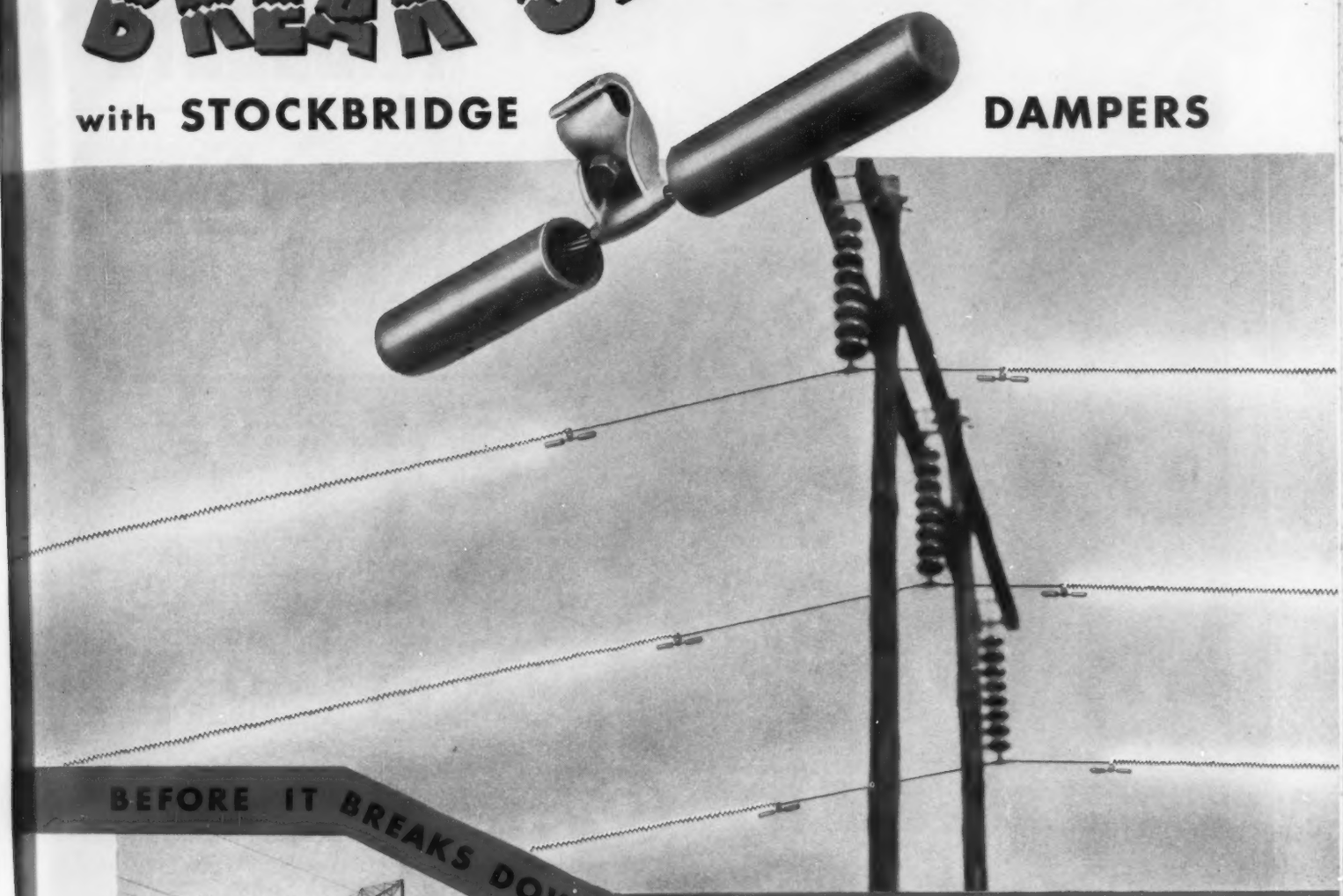
To keep the industry in the West up-to-date on sources of supply locally, ELECTRICAL WEST is making its annual survey and will publish its MANUFACTURERS' DIRECTORY in the April issue.

Water Heaters

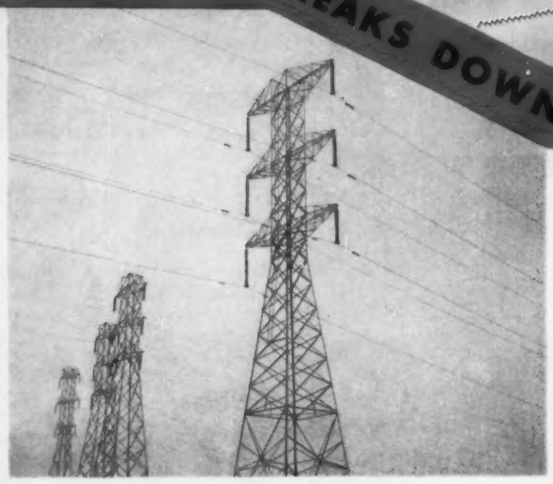
Although restricted in production, water heaters are still available. Peculiarly, selling them in today's market is more difficult. The BUSINESS GUIDE for March will aid dealers to sell stocks available and on hand as a defense aid and necessity.

BREAK UP VIBRATION

with STOCKBRIDGE DAMPERS



BEFORE IT BREAKS DOWN TRANSMISSION LINES



Stockbridge Damper (patented) is manufactured exclusively by Hubbard and Company for the entire Pacific Coast. For prompt service on standard items of Hubbard Pole Line Hardware and Peirce Construction specialties, see your nearest branch of Graybar Electric Company or General Electric Supply Corporation.

When men and machines must be kept constantly at work, hour after hour and day after day, without shut-down or delay, service interruptions must be avoided at all cost. Because of this, transmission lines, *the lifelines of industry's all-out productive effort,* need positive protection against a seemingly tremendous trifle—*Vibration.*

Breakage of overhead conductors due to vibration fatigue at points of support can be prevented by placing Hubbard Stockbridge Dampers near each end of the conductor span, a measured distance from the insulator ties. Thus amplitude is not permitted to build up, as the energy of incipient vibrations imparted to the cable by wind and air currents is absorbed by the resiliently-supported weights of the Damper. Installation is readily made with hot-line tools without interrupting service, and without disturbing existing suspension or dead-end clamps.

HUBBARD

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HANG THE LOAD ON HUBBARD HARDWARE

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"It all comes out in the wash"

Quality shows up quickly when put to the test. That's the reason for the tremendously increased use of Victor Insulators. Only through rigid control; modern manufacturing methods; time-tried experience, is it possible to achieve Victor quality. That's why we guarantee them: "The best you can obtain ANYWHERE at equal prices."

That, too, is why Victor Insulators are relied on to deliver dependable power to America's Arsenal of Democracy.

THE MARK OF A V GOOD INSULATOR

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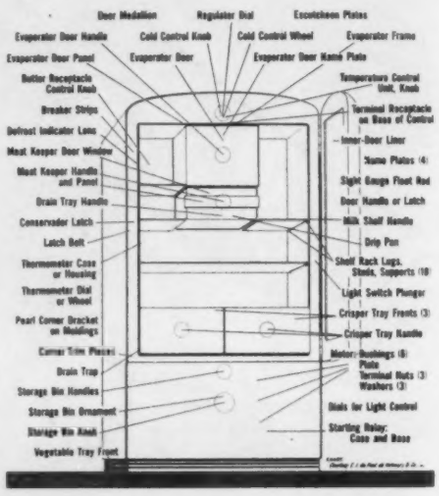
VICTOR, NEW YORK

PRODUCTS *that are news*

1942 Appliance Line-up

In the 1942 show of appliances, plastics have taken the place of metals vitally needed for defense and units have been streamlined, with fewer models and little change in basic design. Manufacturers, for the most part, have



not undertaken expensive retooling of production machinery.

Substitution of plastics, manufacturers claim, has tended to enhance the appearance of the units. Shown is a composite of the various places plastics are pinch-hitting for metals in the new refrigerators.

Kelvinator Refrigerators (200)

Kelvinator has enlarged its refrigerator box and is offering the 1942 line in 7- and 9-ft. sizes only, with six models. All models are powered by the Polarsphere mechanical unit, which operates beneath a sealed steel dome. According to the manufacturer, this unit is powerful enough to produce 1050 pounds of ice a week and, under normal kitchen conditions, uses current only 12 minutes per hour. One model is specially adapted for farm use, having three removable half shelves to facilitate storage of milk cans and other bulky

5/8% step regulators give you Narrow Band Widths WITHOUT 200% HIGHER EXCITING CURRENT!

Allis-Chalmers DFR Regulators Easily Hold 2-Volt Bands . . . Yet Need Only 1/3 the Exciting Current Required by Older Types of Regulators.

ACTUAL TESTS by utility engineers have proved that Allis-Chalmers 5/8% Step Regulators need *only 1/3 the exciting current required by older types of regulators!* Wattless current is cut 67% . . . more system capacity released for pay loads . . . fewer capacitors needed!

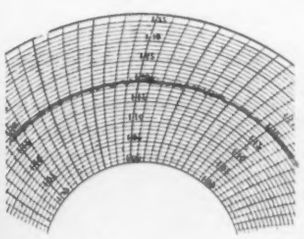
That's one reason why more and more systems are taking advantage of the savings of the Allis-Chalmers DFR — the only station-type step regulator for single-phase, 2400 and 4800 volt feeders on the market today. Here's another . . .

The Allis-Chalmers DFR Regulator easily holds narrow band widths — as low as ±3/4 volts on some feeders. There are no compounding or holding coils . . . the relay is free to follow each voltage fluctuation without excessive damping.

Important, too, are DFR's reduced losses, quieter operation, and minimum maintenance costs — all new standards in feeder voltage regulation.

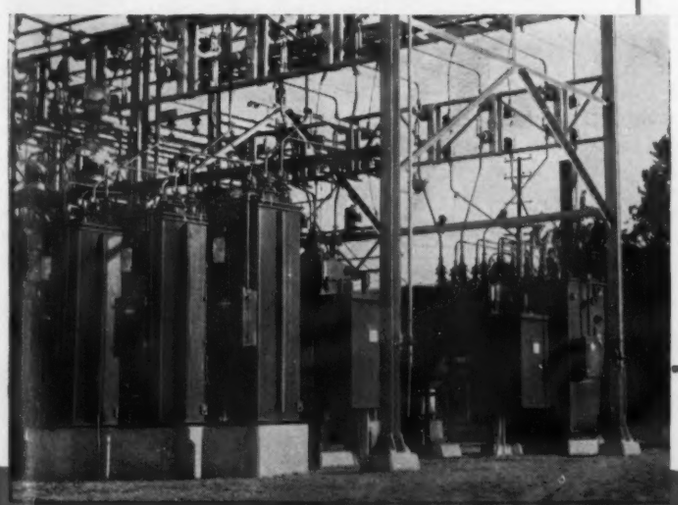
Why not let an engineer in the nearest Allis-Chalmers district office show you how the Allis-Chalmers 5/8% Step Regulator can bring better regulation at lower all-around cost to your system? Call him today. Or write direct to Allis-Chalmers, Milwaukee, for your copy of Bulletin B-6065. A 1408

5/8% STEP REGULATORS Have Been Holding 2-VOLT BANDS FOR 7 YEARS!



When the Allis-Chalmers 5/8% Step Regulator was designed over eight years ago, the size of steps was selected as 5/8 of 1% because data gathered from utilities all over the country indicated that the 2-volt band was desirable.

A look at the accompanying chart —the actual record during operation on the lines of an eastern system — will show you how the Allis-Chalmers DFR *easily* holds a 2-volt band.



On the lines of a southern utility—three 72 kva, 2400 volt Allis-Chalmers DFR's (foreground) and one 216 kva, 4160 volt 5/8% Step AFR Regulator.

These 5/8% Step Regulators Are Famous for Better Regulation at Lower Cost! Choose the Regulator to Fit Your Purpose!

DFR — 12 to 250 kva, single phase
AFR — 20.8 to 750 kva, three phase
CFR (air cooled) — 36-96 kva, 2400 volt, single phase

ALLIS-CHALMERS
MILWAUKEE · WISCONSIN

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DEPENDABLE SERVICE

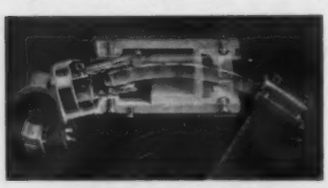
Type RWE-58, 115-kv., 600-a, 1,000,000-kva., MH-4 Motor Mechanism, recently installed in Montana

MEANWHILE YOU CAN REPAIR OLDER BREAKERS *with* EXPULSION CHAMBERS

Yesterday's wise planning for **still more** reliable utility service is helping today's defense program.

Soon you may need Pacific Electric Breakers, like the one pictured, which clear a fault in 5 cycles and which automatically reclose in 20 cycles.

That's possible because of the high-speed Spring-Stored Energy from the Motor Mechanism and the six Arc Expulsion Chambers per pole which extinguish arcs rapidly. Speed, reliability plus rock-bottom maintenance are also offered in other sizes of Pacific Electric Breakers.



EXPULSION CHAMBER
Cross-section view of the famous Pacific Electric Expulsion Chamber.

Service to defense industries may be better protected by equipping older P. E. Breakers with the Expulsion Chambers.

Utilities which have prepared to maintain service in this manner report quicker, safer interruptions; savings on oil and contacts and greater protection to heavy industrial loads.

Get all the facts on insuring reliable service with Expulsion Chambers and assuring maximum efficiency at low cost.

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G. B. Kirkwood, 437 S. Hill St., Los Angeles, Calif.
Myron Swendsen, P. O. Box 156, Boise, Idaho
U. N. Halliday, 230 U. S. Nat'l. Bank Bldg., Denver, Colo.
R. Ackerman, 318 Dooley Block, Salt Lake City, Utah
J. E. Redmond Co., 448 W. Madison St., Phoenix, Ariz.

Other Representatives in Principal Cities

Pacific Electric Mfg. Corporation

5815 THIRD ST., SAN FRANCISCO, CALIF. DUNES HIGHWAY, GARY, INDIANA

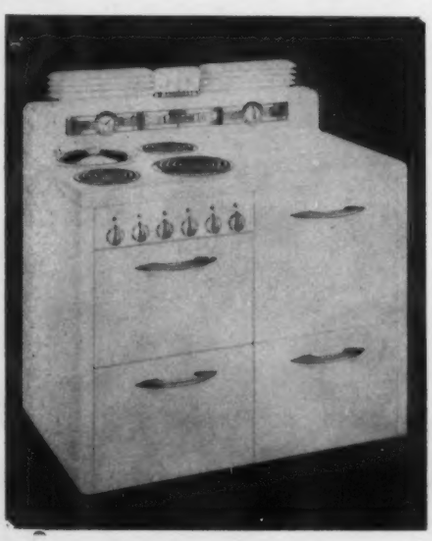
articles, a large ice cube capacity and a spacious vegetable compartment. The "Moist Master," which comes in both the 7- and 9-ft. sizes, tops the line. Humidity has been placed under control in the "Moist Master" by departmentalizing the interior of the cabinet. Prices range from $149.95 to $259.95.

Hotpoint Refrigerators (201)

Hotpoint lists 10 refrigerator models for 1942, with several new convenience features on the 7-ft. "Deluxe Doric" and the 8-ft. "Deluxe" and "Imperial Tudor," leaders in the line. The Easy Clean porcelain enamel speed freezer is equipped with an over-center spring to hold the door open. A defroster indicator tells when defrosting is necessary. A 16-point constant temperature control, butter conditioner, 6-way cold storage compartment, two Hi-Humidity storage drawers, an air purifier and food safety gauge are other features on the deluxe models. These models are of all-steel construction. The complete line includes 6-, 7-, 8-, 12- and 16-ft. models.

Hotpoint Ranges (202)

Hi-speed five-heat Calrod surface units and Flavor-Seal ovens are standard on Hotpoint's 1942 range line. Oven interiors are one piece, finished in porcelain, and with shelf indicators



STRENGTH to support the pole structure under maximum ice and wind loading . . . RUGGEDNESS to withstand the punishment incurred in construction and service . . . DURABILITY that outlasts the normal life of the line . . . are combined—with important ECONOMY—in *Crapo* Galvanized Steel Strand.

Each size and grade develops the full tensile strength of the steel in cross section. The heavy, ductile, tightly-bonded zinc coating—applied by the famous *Crapo* Galvanizing Process—provides lasting protection against corrosion.

There is a size and grade of *Crapo* Galvanized Steel Strand for every practical need. Consult the distributor of *Crapo* Galvanized Products near you or write for further information!

INDIANA STEEL & WIRE COMPANY . . . . . MUNCIE, INDIANA

Crapo GALVANIZED STEEL STRAND

Today It's ALL-IN-ONE Switchgear

STANDARD FH CUBICLES GIVE YOU ALL THIS

1. Modern low-oil-content or air-blast breakers, 500,000 to 2,500,000 kva
2. High-speed, trip-free breaker operating mechanism
3. Six group-operated heavy-duty isolating disconnecting switches
4. Mechanical interlocks for breaker, switches, and doors, to assure correct sequence of operation
5. Heavy-duty structural-shaped buses
6. Heavy-duty bus supports
7. Silver-to-silver current-exchange surfaces on electrical interconnections
8. All necessary current transformers
9. Phases segregated throughout

General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance

Write for Bulletins GEA-3143 and GEA-3658, describing FH Cubicles with oil-blast and air-blast breakers respectively. General Electric Company, Schenectady, N. Y.

COMPLETE EASY TO SELECT EASY TO INSTALL

FH CUBICLES
WITH
AIR-BLAST BREAKERS
IN ONE
COMPACT FACTORY-BUILT ASSEMBLY which
SIMPLIFIES station design by co-ordinating all necessary equipment in easy-to-select "packages"
SAVES time, space, and money, because it is complete and of unit construction
AND IS SHIPPED ready for quick, easy installation at a predictable cost

FOR POWER STATION SERVICE

UP TO 23,000 VOLTS AND 2,500,000 KVA

GENERAL ELECTRIC

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Transmission
and
Distribution
Line
Equipment

KEARNEY EQUIPMENT

PORCELAIN INSULATORS

POLE LINE HARDWARE

TRANSFORMERS

GLASS INSULATORS

WIRES AND CABLES

POLES AND CROSSARMS

PINS AND BRACKETS

GUY STRAND

GALVANIZED IRON WIRE

TIME SWITCHES

CONSTRUCTION TOOLS

HARTZELL PROPELLER FANS

MAYDWELL & HARTZELL
INCORPORATED

Engineers and
Manufacturers' Representatives

LOS ANGELES PORTLAND
SAN FRANCISCO

for quick selection of cooking positions. Four models are equipped with oven interior lights. A permanent Quick Reference chart, fired on the porcelain enamel drip tray gives correct time and temperature for oven operations. The Timemaster for automatic oven cooking and the Timemeasure for short operations are conveniences built in on some models and available as accessories for others. On two models illuminated switch dials show at a glance which units are on and which heats are being used. The "Masterpiece," which leads the line, is equipped with a built-in warming unit which keeps food and dishes at serving temperature. Feature of the Hotpoint Venetia-lite cooking top lamp is a vanity mirror built into the top louvre.

Norge Refrigerators (203)

Streamlining, substitution of plastics for metals and functional improvement are stressed in the Norge refrigerator line. A base leveller, which takes care of floor irregularities, is an innovation. The Night Watch automatic defroster is featured again this year, with an improved clock design. A plastic "bullseye" in the top center of the freezer door allows easy reading of the Cold Control setting without opening the door. The covered Coldpack, Safety Sealed Freezer and Hydrovoir are larger to provide more storage space. The line includes seven models, two 6-ft., three 7-ft. and two 9-ft. One of the 7-ft. models is all-porcelain. Plastics have been used to create new effects in design.

Universal Washers (204)

Leading Universal's 1942 line of "Wash-White" washers are the deluxe nine-pound spinner and wringer type models. A feature of certain units is the plastic non-tear sterilator, with long, wide, triple vanes, scientifically designed to develop upper and lower water currents for thorough washing. The moisture proof, shock proof Time-a-matic switch, marked for proper washing time for different fabrics, times any period from one to 15 minutes and shuts off the current automatically when the washing is done. Select-a-matic pressure indicator assures the correct wringer pressure for every fabric and eliminates wringer clogging, according to the manufacturer. The Universal-Lovell six-position wringer has a push reset lever, protected feeding zones, power electric rolls with automatic roll stop and hydro-matic flume. Other features of the machines are an overload protect-o-switch

COHARDITE
INSULATED TOOLS

No. 21 Socket Wrench
List Price $1.25

Reduce accidents and service interruptions

An ideal meterman's tool that will greatly reduce the possibility of damage through short circuits caused by the tool. Walden Worcester Spintite type forged and tempered steel blade, hardened socket. COHARDITE insulated to the socket head. Available in 5/16", 3/8", 7/16" and 1/2" hex nut size.

Every tool tested to its full rated dielectric strength of 20,000 volts for one minute RMS before it leaves our plant.

A full range of COHARDITE insulated small tools carried in stock for meter and distributor departments.

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The Connecticut Hard Rubber Co.
NEW HAVEN, CONN.

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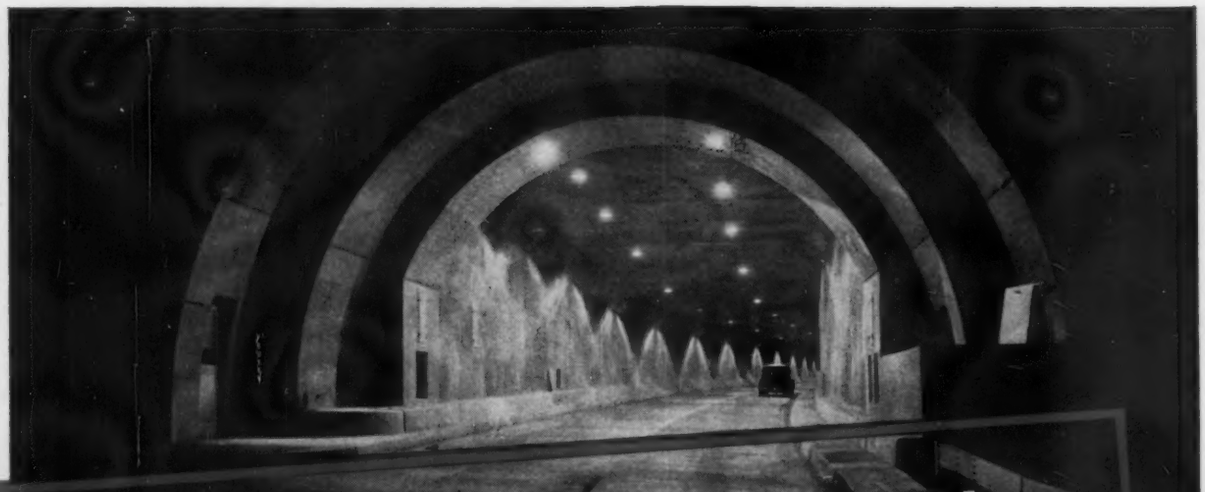
EVERSTICK ANCHORS...

Provide dependable anchoring when poles are subjected to unusual strains from storms. Made of tough, certified, rust resistant, malleable iron for extra strength and holding power.

Write for new bulletin

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA



The Story of a Self-Drying Cable—

HOW OKONITE ENGINEERS HELPED TO PROVIDE UNFAILING LIGHT FOR THE WORLD'S MOST MODERN HIGHWAY

THE PROBLEM

Mercury vapor lamp unit with Okoglass cable lead

Pennsylvania Turnpike Engineers required a cable for mercury vapor lamp leads capable of withstanding the extremely high heat encountered and also capable of supplying unfailing service even after possible exposure to corrosive mine waters (a condition likely to be encountered in event of a prolonged outage). The conductors had to be highly corrosion-resistant as well.

The problem was further complicated by the fact that the assembled lighting unit must be periodically removed for cleaning. This necessitated a cable that could withstand repeated flexing. This combination of requirements ruled out the possibility of using any organic insulation and made a pioneering approach essential.

THE SOLUTION—Okonite engineers were consulted and their pioneer development work done years ago on fiber glass proved to be invaluable. This original research had led to revolutionary designs in heat-resisting cables and brought great improvements to windings for high-temperature electric motors.

Application of the findings of this work to the new problem resulted in a cable construction which consisted of fiber glass insulation and glass braids over an Okoloy-protected copper conductor with aluminum basketweave outer covering. The aluminum sheath was used as the return path for the lamp circuit.

Okoglass-insulated "self-drying" cable

THE PROOF

Test (1) 24" length of cable supported in air at temperatures between 212° and 250°. Tap water dripped on the cable at rate of one drop every 20 seconds. No observable effect on operation; ammeter at lamp showed a reduction in current through the lamp of less than 1/8 of 1%.

Test (2) 24" length of cable immersed in tap water for 23 hours was connected to operate an AH-5 mercury lamp. When power was applied, the cable began to heat up and steam appeared surrounding it. After 2 minutes, the light flashed on and went out. This cycle repeated with longer "on" periods until, after the fourth flash, the light stayed on. Self drying was complete; the cable cooled down to room temperature and appeared perfectly dry.

". . . the proposed cable . . . is fundamentally correct".
—Arthur J. Sweet

THE CONCLUSION—In the words of Arthur J. Sweet, noted lighting expert, who was consultant for the Turnpike authorities and who suggested the basic design of the cable . . . "I regard the tests as establishing that the proposed cable construction is fundamentally correct for the projected service . . . On behalf of my client, I wish to express the most cordial appreciation of your courtesy in making up to our tentative specifications, a 50-foot sample . . . and in affording us the facilities of your laboratory and the invaluable assistance of your men in testing this cable."

AN INVITATION—You, too, may need a cable to overcome some difficult operating condition. Why not ask Our Engineering Service Department to work with you in finding the right solution?

THE OKONITE COMPANY
PASSAIC, NEW JERSEY
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OKONITE
Insulated Wires & Cables

What Causes LUBRICATION FAILURE?

1. Emulsification
2. Oxidation
3. Sludge
4. Foaming

Unacal Turbine Oils were developed expressly to reduce these most common causes of lubrication failure.

They are carefully blended and refined to give you protection against breakdowns and reduce maintenance to a minimum.

Unacal Turbine Oils are available in any four grades to suit your turbine, whether steam or water-operated, direct connected or geared. Extra heavy grades are available for high speed, heavy duty Herringbone and Helical Reduction Gears and Kingsbury Thrust Bearings.

Why not start today to get the right kind of lubrication? Switch to Unacal Turbine Oils. They will give long, trouble-free service.

Your nearest Union Oil representative will be glad to supply you with any additional information. Call him today.

UNION OIL COMPANY

UNACAL
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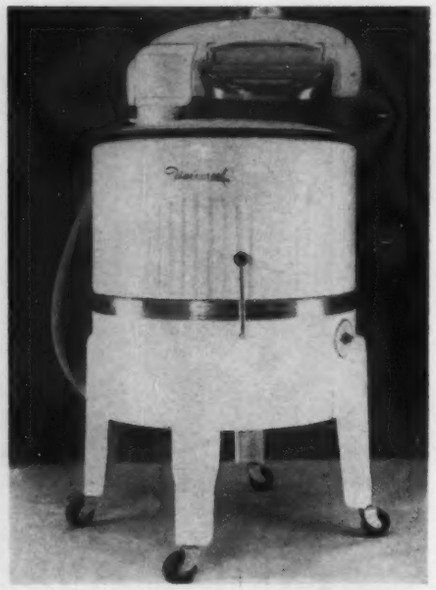
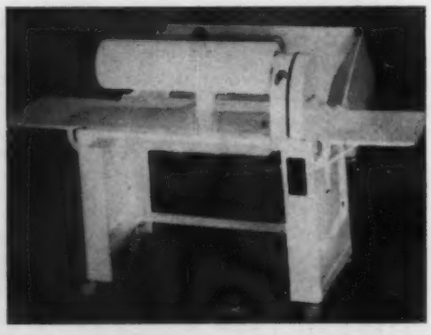


that instantly shuts off the motor in case of strain, overload or stalled wringer; all porcelain tub with hi-baked enamel over Bonderizing; non-clog strainer, finger flick pump control and friction drive Kwick pump.

Universal Ironers (205)

Universal's 1942 Home Laundry division will feature three models in its ironer line. Selling points listed by the manufacturer are the Economy shoe, designed for low current consumption with non-scratch surface; a Protecto-edge to protect fingers from heat and a Duo-thermostat control regulating heat on either half of the shoe and giving a temperature for every fabric. A Knee Type Adjust-a-trol leaves both hands free and starts and stops the roll with one push of the knee. Other features are a drop leaf lap guard which keeps damp clothes off the operator's lap; a pilot light to show when the heat is on and Wind-away cord hooks which eliminate danger of tripping and broken plug replacements. The ironer has an acid resisting white porcelain enamel table top and a Safe-a-matic switch shuts off the current the moment the table top is closed.

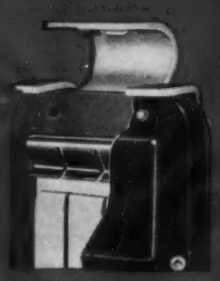


Premier Hand Cleaner (206)

Premier Division, Electric Vacuum Cleaner Co., Inc., has introduced to appliance dealers the model 52 Premier hand cleaner with a plastic nozzle that is considerably lighter in weight than was the pre-plastic construction. The vacuum has a full ball-bearing, 175-watt motor requiring no oiling and a ball-bearing, motor-driven brush.

SETS A NEW STANDARD
in Safety Switch Design
THE NEW *Vacu-Break* SAFETY SWITCH

Note streamlined appearance, and push-type, front-operated rocker handle inside cabinet lines. Below: New Type Arcing Chambers are attached to Overhead Brackets that in turn ride on the operating lever which transmits an over-center, straight line, push-and-pull motion to switch contact heads.



Cut-away view of new formed bakelite arcing chamber shows how snugly the clamping pressure contacts fit therein.

WITH "*Clampmatic*" CONTACTS
AND FRONT-OPERATED ROCKER HANDLES

Get acquainted with the quality switch of the day — the new BullDog Vacu-Break Safety Switch. This new switch, with its "clampmatic" contacts and front-operated rocker handles sets an absolutely new standard in safety switch design.

The handsome, streamlined appearance of the new Vacu-Break Switch; its new, simplified operating mechanism; its perfect clamp pressure yet almost automatic ease of operation; its new, push-type rocker handle inside cabinet lines; all combine to offer you something unique in switch design and in performance.

The new "*Clampmatic*" Clamp Pressure Contacts, and the new snap spring Rocker Handle of the *push* type, assure perfect clamp pressure of the switch contacts while in the ON position combined with almost automatic ease in "making" or "breaking" the circuit.

Write for complete illustrated Bulletin No. 415.

OUTSTANDING FOR ITS EXTREME SIMPLICITY OF DESIGN

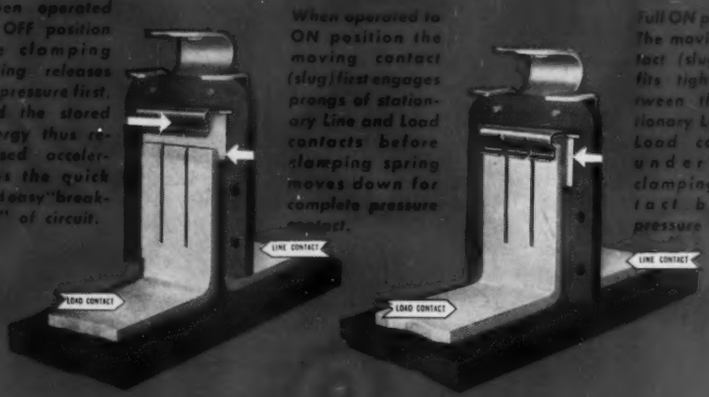
BULLDOG ELECTRIC PRODUCTS CO.
DETROIT, MICHIGAN
BULLDOG ELECTRIC PRODUCTS OF CANADA, Ltd.
TORONTO, ONTARIO

MANUFACTURERS OF Vacu-Break Safety Switches, SafToFuse Panelboards, Circuit Master Breakers, Switchboards, Bus Duct Systems—FOR LIGHT AND POWER

When operated to OFF position the clamping spring releases its pressure first, and the stored energy thus released accelerates the quick and easy "breaking" of circuit.

When operated to ON position the moving contact (slug) first engages prongs of stationary Line and Load contacts before clamping spring moves down for complete pressure contact.

Full ON position. The moving contact (slug) now fits tightly between the stationary Line and Load contacts under full clamping contact by the pressure spring.



Above: Two views of a 200 amp. Switch Head with bakelite cover removed, illustrating the "Clampmatic" principle of pressure contacts.

Win the WAR ON WASTE

• Now is the time to wage war on waste. Food conservation—labor, fuel and energy can best be done the electric way.

Many users of Lang electric commercial cooking appliances tell us of their experiences in saving, speeding up operations and in turning out better quality meals. Lang construction assures long life and efficient operation. Lang automatic controls save time and effort of chefs.

Today, Lang is building for the army, navy and — Victory. These orders are the FIRST orders of the day. However, we can take care of our commercial customers, too.

We urge anyone considering the purchase of Lang electric equipment to plan ahead and order ahead.

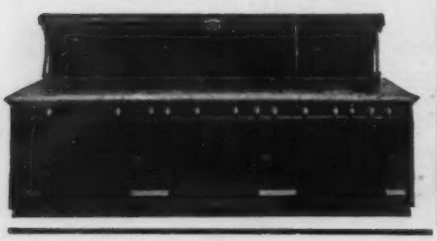
F. S. LANG MFG. CO.

Portland—Seattle—Spokane

Builders of

LANG

STANDARD AND CUSTOM-BUILT HEAVY DUTY ELECTRIC RANGES, COOKING TOPS, OVENS, GRIDDLES.



Westinghouse Ranges (207)

A "control center," with dials and switches grouped on the left back panels away from surface units, is an improvement in the Westinghouse range. The line also features the Single Set switch for automatic surface cooking, Corox five-speed surface units and roomy ovens with automatic controls. On two models, the cooking surface is illuminated by a 20-watt fluorescent lamp concealed in a cowl formed by the upper portion of the range back panel. An improved oven vent is easier to keep clean than former types and effects a 20% reduction in steel requirement. The "Regent" tops the line, which includes seven models. Color motif is blue, carried out in plastic nameplates and insignia.

Westinghouse Refrigerators (208)

To conserve vital materials, Westinghouse has reduced its refrigerator line from 15 last year to six models in 1942—four 7-ft. and two 9-ft. boxes. The True-Temp control system has been extended this year to the entire line. Full-sized evaporators are provided on all models. Porcelain enamel with ornamental facing has been substituted for aluminum on the evaporator door, making it heavier and adding to its appearance. New feature is a storage bin which opens outward without the necessity of opening the refrigerator door. The "Dolly Madison 7" leads the 1942 line. This model, which has a turquoise blue interior, features 16 possible shelf arrangements. A new convenience is a hinged shelf for storing large containers.

For Better Service-
INSTALL
TRICO
REG. U.S. PAT. OFF.
RENEWABLE FUSES
With the famous Powder-Packed Element
KLIPLOK CLAMPS
Lock fuses and clips together
KANTARK FUSES
With genuine fibre tubes (not paper)
COLORTOP PLUG FUSES
The color tells the size
FUSE PULLERS
Pull and replace fuses safely
OILERS
Glass and Unbreakable types for every application. Stops guesswork - bearing failures- waste- idle machinery, etc,
WRITE FOR BULLETINS
COAST REPRESENTATIVES
W. E. Young Co., 1944 Broadway, Denver
H. H. Van Luven, 307 E. 3rd St., Los Angeles
Albert S. Knight, 3006 E. 3rd St., Seattle
Pacific Industrial Products Co., 9th & Harrison Sts., Oakland, California
TRICO FUSE MFG. CO., Milwaukee, Wis.

BANK WITH US BY MAIL

You don't waste time running around to every store to pay your bills . . . you just mail your check. Then why don't you save additional time and trouble in handling your bank affairs by using our Bank-by-Mail Service? It's the same idea. Write today for simple instructions for banking by mail.

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank

Member Federal Deposit Insurance Corporation

LIGHT THE WAY TO VICTORY

TELL US WHAT YOU NEED

Factory Lighting of all types — Office and Engineering Dept. Lighting to fit every requirement—single units or long, continuous strips—open and enclosed troffers, recessed or exposed—all engineered to fully utilize the higher efficiency of fluorescent... *SEND FOR CATALOGS* with design illustrations and complete specificational data.

MAKE every hour count—with Day-Brite Fluorescent Fixtures... They light the way to Victory, from details on the drafting board to accuracy on the production line... They limit eye fatigue, help work to closer standards, insure spoilage reductions, and keep up morale through every hour of a full work week!

For greater man-hour output—for more speed with less strain—turn your lighting problems over to Day-Brite Engineers... Call in your local Day-Brite representative—he will give you "on-the-ground" engineering assistance, backed by an experienced organization geared to accurate production in a large, streamlined, modern plant.

DAY-BRITE LIGHTING, INC., 5470 Bulwer Ave., St. Louis, Mo.

DAY-BRITE SUPER TWO-HUNDRED
For Factories, Mills

DAY-BRITE KINGSWAY
For General Offices

DayBrite Rivals Daylight

Adds Defense Hours!

THE COMPLETE LINE OF FLUORESCENT LIGHTING FIXTURES

Nationally distributed through all leading electrical supply houses.

Day Brite FLUORESCENT FIXTURES

37

Yacht Rigging and Forgings

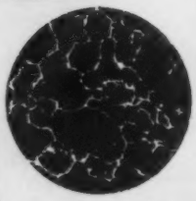
(An imaginary conversation with a yachtsman)
Q..."How many strands in your stays (wire rigging)?"
A..."Six strands, but nineteen wires to the strand."
Q..."Why not use one large wire?"
A..."One wire would have to be pretty husky to take that strain."

And there is a very crude but effective explanation of the grain structure in a forging. Many tough fibres of steel make up the forging billet. Forging further refines this grain structure, giving superior strength with lightness.

THE BREWER-TITCHENER CORPORATION
Cortland, New York

FORGERS OF HI-LINE HARDWARE

LITTLE LESSONS IN FORGING

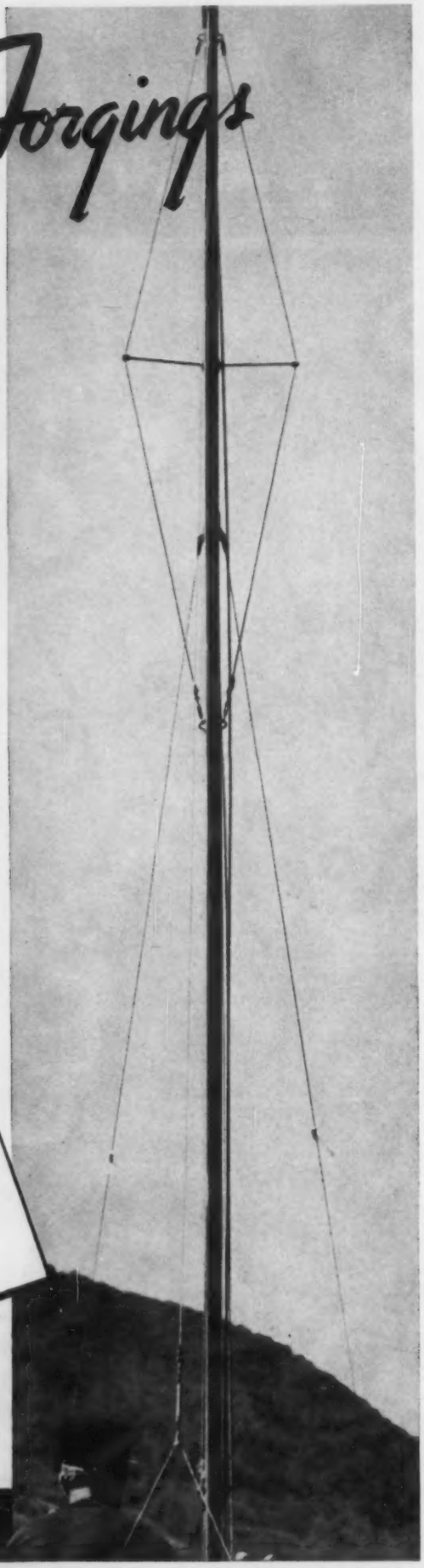


To the left is a photomicrograph of one strand out of six, in a piece of 1/8 inch wire. Directly beneath it is a section of a photomicrograph taken from a steel company's grain chart. This particular photo was selected only because it so aptly demonstrates the similarity in the minute wires and the actual grain of the forging billet. This grain can be controlled in the forging process to give strength at all points.

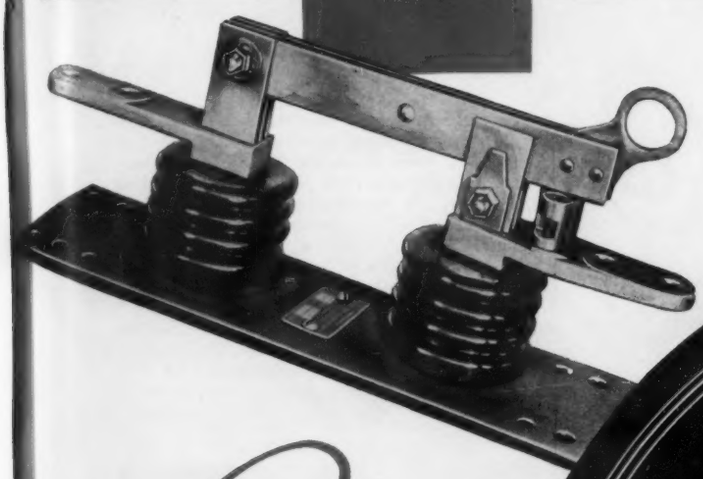
A fully illustrated booklet outlining the history of forging will be sent free on request as long as the supply lasts.

THROUGH YOUR INSULATOR MANUFACTURER ONLY

YOU KNOW WITH A FORGING



STANDARD DUTY
15,000 Volt
600 Ampere
TYPE HPS



R&IE

HI-PRESSURE CONTACT

Disconnecting Switches

FOR ALL PRESENT AND FUTURE NEEDS

From standard average capacity to extra heavy duty and special requirements—from Alpha to Omega—there is an R&IE indoor switch to do the job. R&IE designers and craftsmen know today's problems and continually anticipate the future. R&IE design features, such as Hi-Pressure Contacts at jaw and hinge, offer you extra assurance of continuous service and customer good will.

RAILWAY AND INDUSTRIAL ENGINEERING CO.
GREENSBURG, PA.

In Canada—EASTERN POWER DEVICES, Ltd., TORONTO

Alpha TO Omega

SPECIAL
7,500 Volt
5000 Ampere
TYPE HPS

CONTROLS ON "MESS DUTY"

Many of the potato peeling machines used by both Army and Navy are equipped with Ward Leonard Motor Starters. Our long experience in designing and building electric controls, through the intensive electrification period of industry, admirably fits us for the present emergency. We know how to meet special control requirements and produce in quantity to government standards.

WARD LEONARD

RELAYS • RESISTORS • RHEOSTATS

Electric control (WL) devices since 1892.

WARD LEONARD ELECTRIC COMPANY, 48 SOUTH ST., MOUNT VERNON, N. Y.

"V" No Apologies!
Many Regrets!

Most material handled by Marwood is essential to National Defense, and many items are on the "scarce" list.

In our effort to co-operate with the Defense Program we are unable to accept many orders that do not carry Priority.

If you are one of those who have been refused shipment because of "No Priority"—we wish to extend our sincere regrets and express the hope that once again, in the not too distant future, we will be able to serve you.

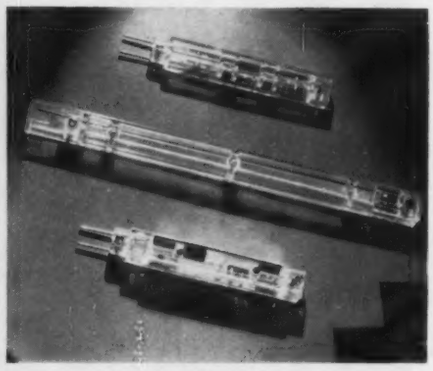
All must concentrate on the objective at hand—"Win This War and Win Lasting Peace." We are "All Out"—Nothing shall stand in our way.

MARWOOD LIMITED

357-361 NINTH STREET • SAN FRANCISCO
SEATTLE LOS ANGELES PORTLAND

Plastic Wiring (209)

A residential and industrial type surface wiring system, using plastic as its basic material, has been developed by Pierce Laboratory, Inc., Summit, New Jersey. Trade-marked Pierceway, the development won top award in the Architectural classification of the Sixth Annual Modern Plastics Competition. The wiring, which was put on the market following eight years of research, is said to provide more adequate outlets at a cost commensurate with conventional installations. Successful use of thermo-setting plastic housings in a surface wiring system, permitting distribution of electricity in "bare" rather than insulated conductors, is a basic principal in the development.



The new system employs only two basic materials—metal for conducting the current and non-current conductive plastic housings—saving essential materials such as steel, zinc, brass and rubber. Advantages claimed for the product by its manufacturer are: ample capacity; electrically non-conductive plastic housings; adequate mechanical protection; lower initial installation cost; rapid assembly or installation; simple disassembly and reassembly; and equivalent electrical facilities with a substantial reduction in the volume of essential materials used.

The residential system is smaller in dimensions than the industrial type, has No. 12 copper conductors and provides 30 amp. capacity with duplex outlets at 12-inch intervals. The industrial type employs tubular copper conductors and provides 45 amp. capacity with outlets at eight-inch intervals.

New Transformer (210)

Designed for low voltage, outdoor metering service, a new 1200-volt current transformer has been developed by Westinghouse Electric and Mfg. Co. This unit is the first of its kind available at a rating below 5000 volts. Known as the WO-1 Dry Type Current Transformer, it has three ratings, 200/5, 400/5, and 600/5 amp. The design permits long range accuracy since it is good for 150 per cent normal current continuous operation without exceeding 55 deg. C. rise with a 40 deg. C. ambient. Mechanical strength against instantaneous overcurrent is 250 times normal current. R.M.S. first peak and thermal capacity of the windings will permit 70 times normal current for one second. The end frames of the transformer completely surround the wound type coils, bracing them against disruptive effects of short circuit current. The transformer is enclosed in a welded steel case with strap primary terminals, and the mounting plate is slotted for pipe frame or single cross arm mounting.

From White River Junction to San Diego

G-E Wiring Materials Distributors want to cooperate with you in working for U. S. Victory

M. N. Snyder, 20 years with the General Electric Supply Corporation, Cleveland, Ohio, is always eager to explain his line when talking with customers. Here he is describing G-E switches to W. D. Ford, one of the purchasing agents of the Aluminum Company of America.

Starting the day with a smile Jim Santorelli, construction materials specialist at the General Electric Supply Corporation, White Plains, N. Y., goes off to call on customers eager to help them. He likes to demonstrate products at every opportunity.

Sure, there are a lot of G-E Wiring Materials Distributors in business today . . . many scores of them stretched across this busy country of ours. But that's a matter of mere geography.

Far more important to you is the fact that the G-E Wiring Materials Distributor in your locality is equipped to help you with ideas . . . service . . . products . . . experienced manpower.

You'll find it reassuring to talk with a representative of YOUR G-E Wiring Material Distributor. You'll find that he is eager to cooperate with you in contributing to U. S. war efforts.

Ask him what electrical raceway to specify for an unusual installation . . . the most suitable cable insulation for a particular requirement . . . what steps must be taken to obtain work in this emergency. If he doesn't have the answers on the tip of his tongue, he'll know where to find them quickly.

Like other distributors, G. W. Knowlton, (left) sales manager at the Des Roberts Electrical Supply Co., Lynn, Mass., wants to provide his customers with materials especially for war projects and at the same time be able to replace his stocks. Therefore, he gives his customers all information possible on priority procedure as he is doing above for B. A. Marshall, local contractor.

O. E. Frankenbush, vice president of the Hawkins Electric Co., Chicago, Ill., is famous for his use of the telephone in conducting business. He is in charge of all internal sales and handles practically all of his estimating and contracting over the telephone.

G-E Wiring Materials Distributors can tell you about G-E Wiring Materials: Conduit Products, Wires and Cables, Wiring Devices. Ask YOUR G-E Wiring Materials Distributor about them today. Appliance and Merchandise Department, General Electric Co., Bridgeport, Conn.

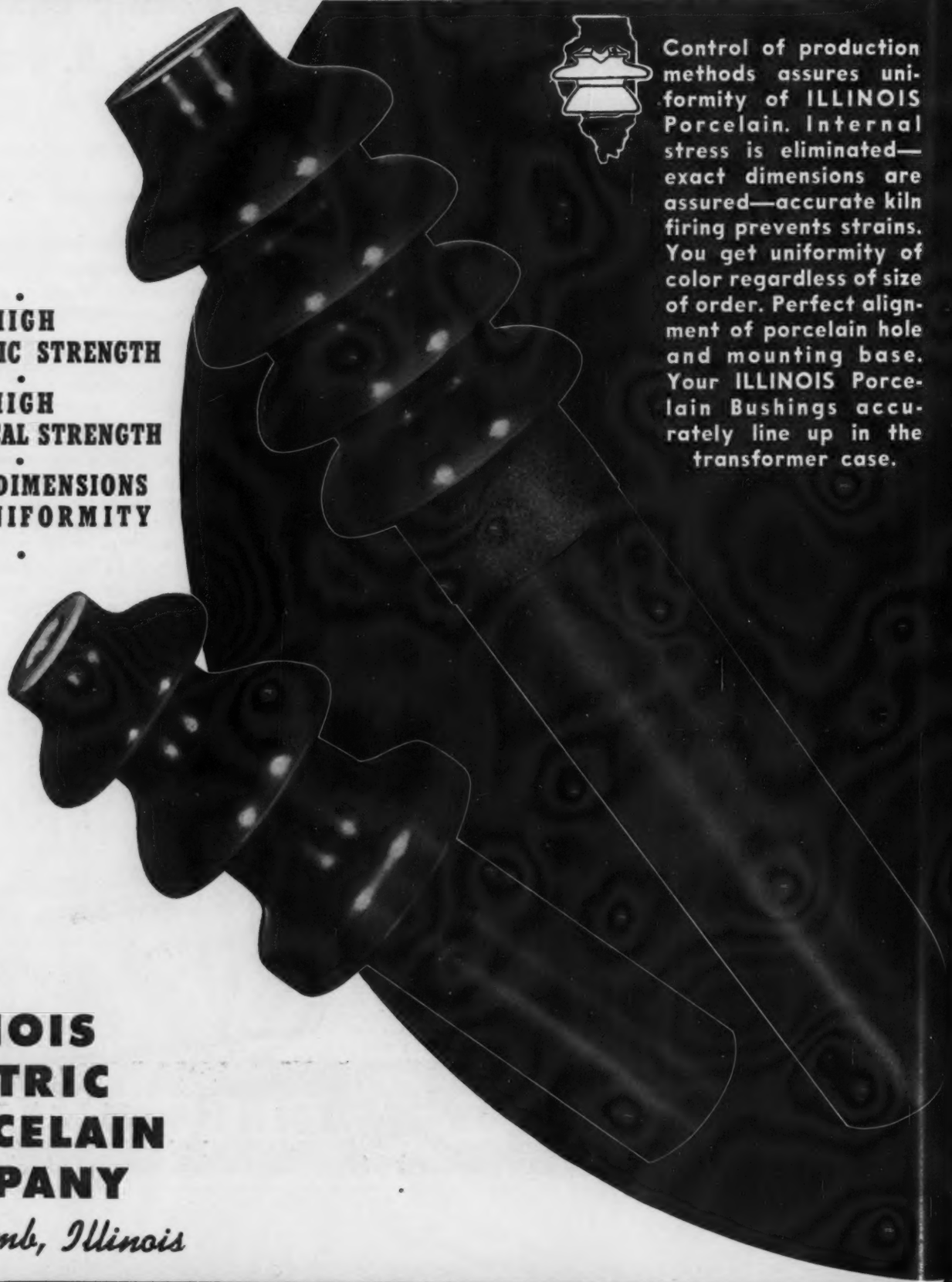
GENERAL ELECTRIC

You get Uniformity in

ILLINOIS PORCELAIN BUSHINGS

Control of production methods assures uniformity of ILLINOIS Porcelain. Internal stress is eliminated—exact dimensions are assured—accurate kiln firing prevents strains. You get uniformity of color regardless of size of order. Perfect alignment of porcelain hole and mounting base. Your ILLINOIS Porcelain Bushings accurately line up in the transformer case.

- HIGH DIELECTRIC STRENGTH
- HIGH MECHANICAL STRENGTH
- EXACT DIMENSIONS AND UNIFORMITY

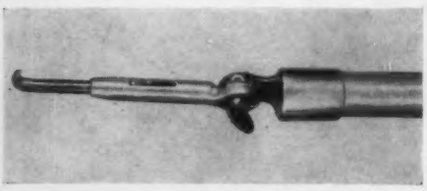


ILLINOIS ELECTRIC PORCELAIN COMPANY

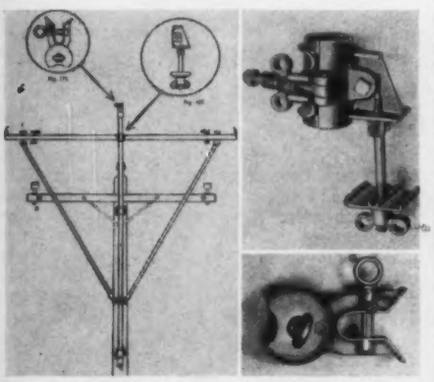
Macomb, Illinois

Line Tools (211)

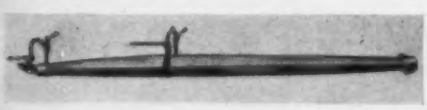
New tools designed by the A. B. Chance Co. include a cotter key remover and auxiliary arm fittings to simplify hot line maintenance work and a heavy duty gin pole. The new



Universal Snap-Out Cotter Key Remover is for disconnecting and connecting insulator strings and the manufacturer claims that it can reach into difficult places and make contact with key eyes which are almost buried in hardware. Its spring action delivers a hammer blow.



Use of the new arm attachments will permit adjustment of the Tips Auxiliary Arm to fit any ridge pin structure so that all conductor holders will engage all conductors at the same time and lift them in one operation. This eliminates the necessity of raising the arm and clamping it again while the ridge pin conductor is untied and secured to the center wire holder.



The gin pole was designed for heavy conductors or line materials and provides a means for securing additional working height of five feet above the pole. This gin may be used as a pole top gin or as a boom pole for heavy duty work. Of laminated wood construction, it is tested to withstand 75,000 volts per foot for five minutes, the manufacturer states.

Indirect Luminaire (212)

An indirect luminaire has been developed by the Edwin F. Guth Co. that uses a 300-deg. white inner reflector affording higher lighting efficiency, according to the manufacturer. Ornamental stamped steel ends of the fixture are welded to the upper half of the luminaire and the lower bottom of the fixture basin is easily removed for installation or servicing. Joined to the underside of the reflector are the accessories for the 2-40, 65 or 100-watt lamps accommodated by the unit.

RUBBER COVERED POWER CABLES • BUILDING WIRE
VARNISHED CAMBRIC • FLEXIBLE CORDS • LEAD ENCASED AND PARKWAY CABLES • ARMORED CABLE
CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

CRESCENT
Genuine A.B.C.
Armored Bushed Cable

SAFEST
Factory Assembled Wiring System

CONDUCTORS—Clean stripping insulation and flame retarding covering, printed as shown.

BUSHING—easy to insert as paper unwraps from *under both ends* of armor to make room for the bushing.

STEEL ARMOR — good conductivity, electro-galvanized for maximum uniformity and longest life.

TESTED — Thoroughly tested at several points during manufacture and receiving a final test of 2000 volts between conductors and armor.

CRESCENT has unexcelled facilities for the COMPLETE manufacture of Armored Bushed Cable in all its steps. When you buy CRESCENT A.B.C. ARMORED BUSHED CABLE you buy the best. Do not be satisfied with any substitute.

CRESCENT INSULATED WIRE & CABLE CO.

CRESCENT
WIRE and CABLE
Factory: TRENTON, N. J.—*Stocks in Principal Cities*

LOS ANGELES
Tri-State Supply Corp.
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SAN FRANCISCO
Hodges & Glomb
1264 Folsom St.

KANSAS CITY
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2627 McGee St.

CRESCENT ENDURITE SUPER - AGING INSULATION

THIS MAN may be wearing a badge that reads "visitor", but you can bank on the fact that he's here on a more important mission. The chances are he's answering a request from some key man in plant operations to come in and help solve a lighting problem essential to efficient war production.

GRAYBAR Lighting Specialists have worn plenty of "visitor" badges in all kinds of plants — and every one has added to the background of experience which helps them to save time, save money, and to assure high "seeing" standards. Their close liaison with leading manufacturers, contractors and utility lighting engineers brings broad-gaged assistance on any problem that requires it.

Similarly, GRAYBAR Specialists on other important electrical problems . . . outside construction . . . power distribution . . . signaling . . . motors and controls . . . are equally qualified. Their services are always available to GRAYBAR customers, supplementing that of GRAYBAR'S experienced local representatives.

GRAYBAR
in over 80 principal cities

Executive Offices:
GRAYBAR BUILDING, NEW YORK

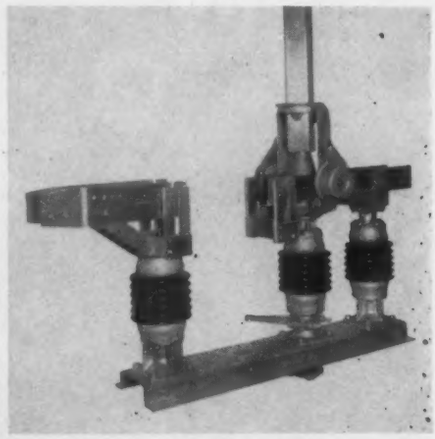
*GraybaR Everything Electrical *GraybaR ELECTRIC COMPANY
QUALITY SINCE 1869 *REG. U.S. PAT. OFF.

Push Button Stations (213)

The Square D Co. is offering a new series of Class 9001, Type M push button stations and enclosures, designed to give greater flexibility of application. Heavy cast construction of the enclosure guards against accidental damage to control units. Enclosures are available for 3, 6, 9, 12 and 16-push button, selector switch or pilot light control units. Each is furnished as an assembled station or as an enclosure only. Closing plate assemblies are provided for unused openings in the cover plate. The enclosure consists of a cast iron case, gasket and steel cover plate, drilled to accommodate standard drip-tight control units. The case may be drilled and tapped for conduit entrance in five locations. The new devices are finished in blue-gray enamel.

Improved Switch (214)

An improved 3,000-amp. 23-kv. switch is announced by the Delta-Star Electric Co. This single pole unit of a 3-pole switch has a square copper tube blade which, by means of a 45-deg. bearing mounted on top of the center rotating insulator unit, is raised or



lowered. According to the manufacturer, the same movement also turns the blade corners into high pressure connection with fixed contacts at both blade ends. Coiled springs enclosed in circular housings at the hinged end of the blade counterbalance it and the switch is easily operated.

"No Blink"

Says the Wise Old Owl

when YOU use Lloyd's New No Blink Starters

Lloyd leads again! The last word in "no-blink" starter construction! Has the rigid glass stem assembly that insures perfect alignment of parts and perfect operation. Combines with it a "long-life" automatic thermal switch which opens the circuit if a lamp fails to light. Absolutely stops blinking and flickering of lamps which have gone bad. Interchangeable with FS-4 for use with 40-watt lamps only.

Lloyd Policy Insures Quality

LLOYD PRODUCTS COMPANY

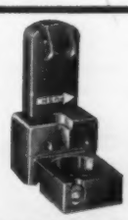
Box C, Edgewood Station, Providence, R. I.

Representatives, Branch Offices and Warehouses in 22 Leading Cities

Lloyd Twist Type Lamp Holder with Starter Socket Blk. Cat. 353 Wht. Cat. 353-W Combined with Starter Socket Cat. 252 Pats. Pend.

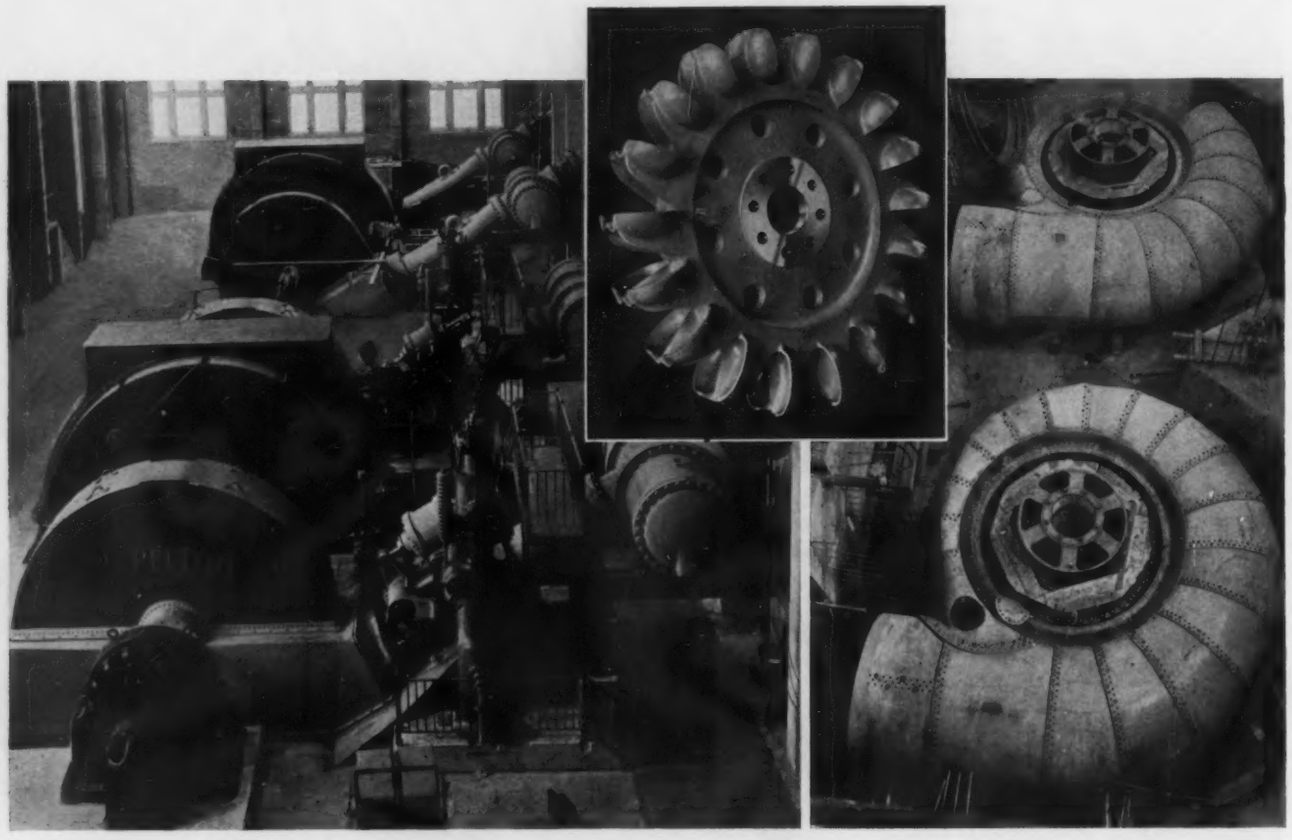
Lloyd Starters
FS-2
15-W 18" lamps
20-W 24" lamps
FS-4
30-W 36" lamps
40-W 48" lamps
FS-6 100-watt

Lloyd Starter Socket with "Lobster Claw" Dual Lock Blk. Cat. 252 Pat. Pend.



Lloyd Push Type Lamp Holder with Starter Socket Blk. Cat. 253 Wht. Cat. 253-W Combined with Starter Socket Cat. 252 Pats. Pend.

Implements of War and Peace



THIS is a war of material resources as well as men. Behind the fighting lines stand the great industries in an all out effort to provide guns, tanks, aircraft, ships, housing, clothing, food and other implements, all essential to ultimate victory.

The power utilities must supply electrical energy in unprecedented quantities for all industries. Their facilities are being expanded with additional generating capacity, a program in which Pelton engineering plays a leading role. More than 350,000 horsepower in hydraulic turbines are now in production, in addition to which Pelton facilities are producing many other machines and devices to assist in the war effort.

THE PELTON WATER WHEEL COMPANY

Hydraulic Engineers

120 BROADWAY	2929 NINETEENTH ST.	PASCHALL STATION
NEW YORK	SAN FRANCISCO	PHILADELPHIA

EXCLUSIVE WESTERN REPRESENTATIVES for Baldwin-Southwark Division of Baldwin Locomotive Works, De La Vergne Sales Co., Woodward Governor Co., Cone Valve Division, Chapman Mfg. Co., and Carbondale Division, Worthington Pump & Machinery Corp.

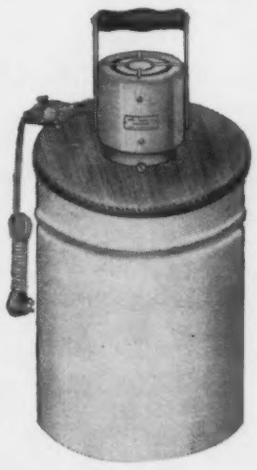
BLW THE BALDWIN GROUP

PELTON

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

Electric Churn (215)

An electric churn developed by the Lite-nin' Products division, the Vent-A-Hood Co., Dallas, Texas, is a new item for the appliance dealer. The manufacturer claims that it will produce up to 25% more butter in less time than the hand operated churn and uses no more electricity than an ordinary light globe. Lite-nin' Electric Churns are furnished with durable metal container, white baked enamel finish on the outside and sanitary electric tinned on



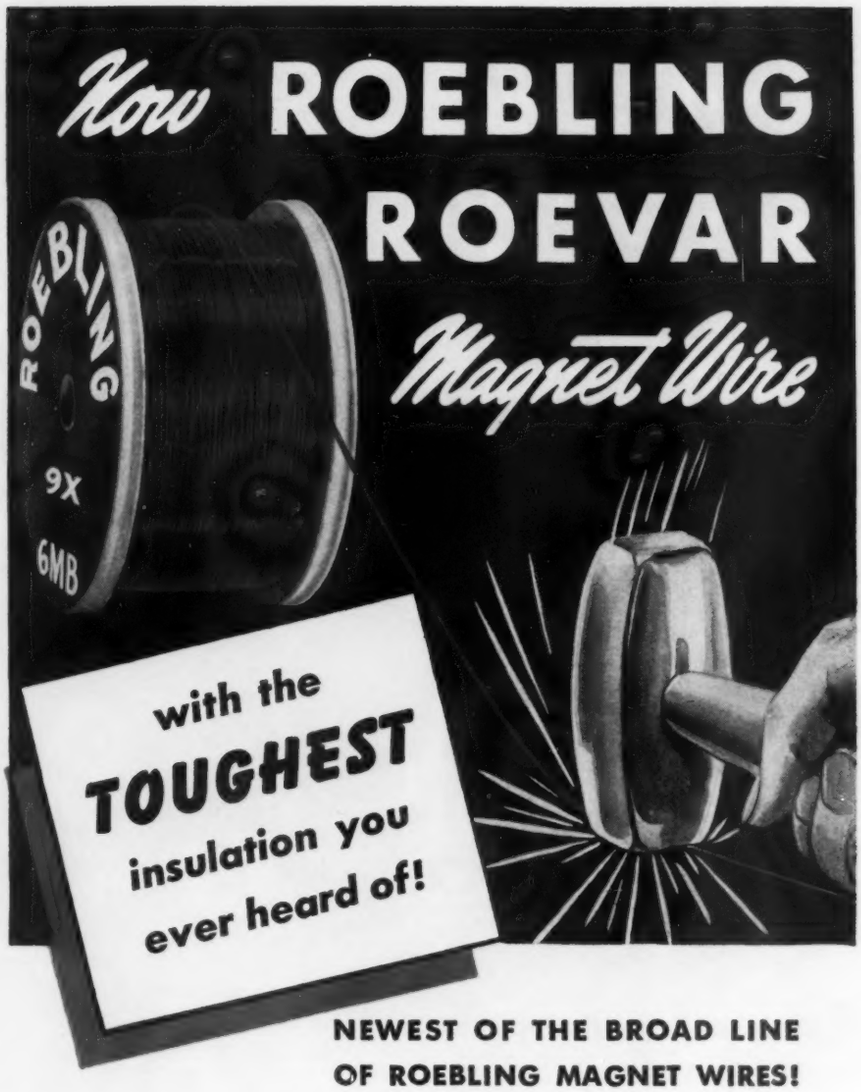
the inside. A maple lid and dasher are easily disassembled for cleaning. The splash proof white enameled motor has a hardwood handle. 78 watts, 110 volts, 60 cycle. Price for the 3-gal. size is $14.95 list; for the 2-gal. $12.95 list.

New Bus Duct (216)

A new bus duct has been announced by Westinghouse for industrial secondary power distribution systems. Units are of plug-in and feeder types. Composed of copper busses, Prestite separators and a dust-tight metal enclosure, the unit is available in ratings of from 250 through 1500 amp. At currents below 1500 amp., long life, hot rolled sheet steel is used; at values of 1500 amp. or above a feeder duct of different construction is available. Plug-in sections are supplied in 10-foot line units with outlet service staggered every 12 inches along a run. Outlet receptacle covers are not removed but simply slide along duct to expose plug-in connections. Contact areas at bus bar joints are silver plated. Insulators are of Prestite. Complete insulation of plug-in receptacles is a safety measure.

"Vacu-Break" Switch (217)

Bull Dog Electric Products Co. have a "Vacu-Break" safety switch with contacts and front operated rocker type handle. The "clampmatic" switch contacts are designed to secure and maintain clamp pressure of the switch contacts when in the "on" position; yet allow a normal push of the operating handle to make or break the circuit with automatic ease. The simplified operating mechanism transmits a direct overcenter action on the switch contacts which, according to the manufacturers, ensures positive make and break. The front operated rocker handle is of a push type eliminating lost motion mechanism and a knife-edge two-point bearing gives extreme sensitivity for positive on and off operations.



NEWEST OF THE BROAD LINE OF ROEBLING MAGNET WIRES!

Yes, it's a new synthetic resin insulating film — strong, flexible and tough. But you can't appreciate just *how* tough — until you've had a sample of Roevar Magnet Wire in your hand and tried it. Under actual test it proved 3 times more resistant to abrasion than ordinary enameled wire.

And, since a fabric wrap is unnecessary, it is smaller — permits the use of MORE COPPER—LESS INSULATING SPACE.

In addition, Roevar resists the solvents and high baking temperatures of treating varnishes—stands up under the abuses of modern high speed winding machines and assembly operations. That means FASTER WINDING—EASIER HANDLING—because the copper, like all Roebling Magnet Wire is "dead soft".

Made in a wide range of sizes—12 to 40 A.W.G.

**Roevar is made under license agreement with General Electric Co.*

JR ROEBLING

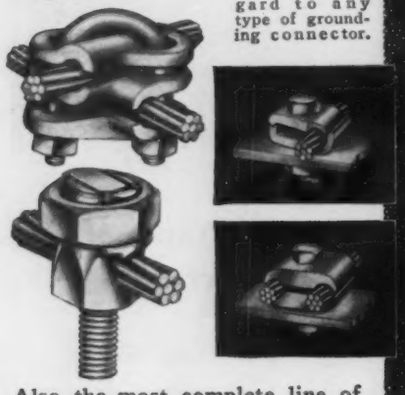
JOHN A. ROEBLING'S SONS COMPANY OF CALIFORNIA
San Francisco • Los Angeles • Seattle • Portland

The MOST COMPLETE LINE OF *Grounding Connectors*

These pictures can only give you an idea of the variety, because — **Penn-Union makes ALL good types.** A complete line of clamps, studs and connectors for all applications. For all combinations of pipe, rod, flat bar, cable, braid, tubing.

Every one a **DEPENDABLE** unit of protection for personnel and equipment — of ample capacity, high mechanical strength, and resistant to corrosion.

Write us in regard to any type of grounding connector.



Also the most complete line of Service Connectors, Cable Taps, Terminal Lugs, Tees, and other fittings. *Penn-Union is the choice of leading utilities and industrials, contractors, and manufacturers of electrical equipment.*

F. M. NICHOLAS CO.
1123 Harrison St., San Francisco
KENNETH ANDERSON CO.
2115 So. San Pedro St., Los Angeles
NORTHWESTERN AGENCIES
2411 First Ave., Seattle, Washington
Penn-Union Electric Corp., Erie, Pa.

PENN-UNION
Conductor Fittings

Plastic Fan Blades (218)

Use of sheet plastic as a blade material for Airistocrat quiet propeller fan blades has been adopted by Torrington Manufacturing Co. as a temporary expedient for the emergency. The material is light weight, non-resonant and non-corrosive and performance in tests was nearly identical to that of steel and aluminum blades, the manufacturer states.

Blackout Bulb (219)

A blackout bulb, which provides downlighting in a soft beam of blue light, has been designed by the Wabash Appliance Corporation, Brooklyn, N. Y. The bulb is lined inside with a pure silver reflector lining that hides filament glare and projects the light downward. Light leaks are prevented, according to the manufacturer, by a black silicate coating that covers the bulb to the extreme lighting end, which is a deep blue. The new bulb consumes 25 watts and will list at 45c.

Wiremold Lamp Units (220)

A new series of Wiremold V-type two-lamp industrial units with porcelain enamel reflectors, using the basic Wiremold No. 3000 channel and fittings, providing flexibility in installation either as single or multiple 2-lamp units making continuous runs of double Line-O-Lamps comprising any desired number of lamps are available for 20-watt or 40-watt fluorescent lamps from the Wiremold Co. Hangers and fittings are available for installation against ceiling surfaces with canopies and adapters to cover the existing ceiling outlets, or for hanging at required levels below the ceiling.

Fence Control (221)

A high line electric fence controller has been manufactured by the Prime Manufacturing Co. which features alternating current delivered to the fence line, a short signal light, short meter, soil selection switch and a safety circuit breaker.

SMOOT-HOLMAN
SMOOT-HOLMAN COMPANY
SIGHT-CRAFT
INGLEWOOD CALIFORNIA

LUMINAIRES FLUORESCENTS
REFLECTORS FLOODLIGHTS

INDUSTRIAL AND COMMERCIAL LIGHTING EQUIPMENT

HOME OFFICE AND FACTORY
INGLEWOOD, CALIFORNIA

WAREHOUSES

SAN FRANCISCO — 460 7th Street
HOUSTON, TEXAS — 315 Crawford St.

REPRESENTATIVES

FRED ZAUGG — 907 N.W. Irving St. — Portland, Ore.
COAST SALES CO. — 307 Main Street — Seattle, Wash.
STEVENS SALES CO. — 41 Post Office Place — Salt Lake City, Utah
G. S. SPANGLER — 618 Colorado Bldg. — Denver, Colo.

BEAT CONTRACT DATES with IDEAL Wiring Devices

NEW! **Wire and Cable Reel**

Trouble-Saver — Prevents those exasperating snarls and knots. Prevents damage to wire.
Adaptable — Handles insulated wire No. 18 to No. 2 cord, cable, Romex, etc.
Convenient — Hangs anywhere, singly or in tandem.

IDEAL Wire-Nuts

Solderless, Tapeless, Wire Connectors
STRIP WIRES—SCREW ON—THAT'S ALL
Safer — No hot soldering or blow torch.
Better Electrically — stronger mechanically.
Thread on to wires just like a nut on a bolt.
Sizes for all common wire joints.
Fully approved — listed by Underwriters' Laboratories, Inc.
MILLIONS IN USE — Send for FREE Samples

Other IDEAL Job-Speeders

IDEAL SOLD THROUGH JOBBERS

IDEAL COMMUTATOR DRESSER COMPANY
WEST COAST WAREHOUSE STOCKS:
Stribey & Barton Ltd., 912½ E. 3rd St., Los Angeles, Cal.
F. M. Nicholas Co., 1123 Harrison St., San Francisco, Cal.
L. S. Foley, 1233 N. W. 12th Avenue, Portland, Oregon
Robinson Sales Co., 3215 Western Avenue, Seattle, Wash.

You, too, can

+ ADD
− SUBTRACT
× MULTIPLY
÷ DIVIDE . . .

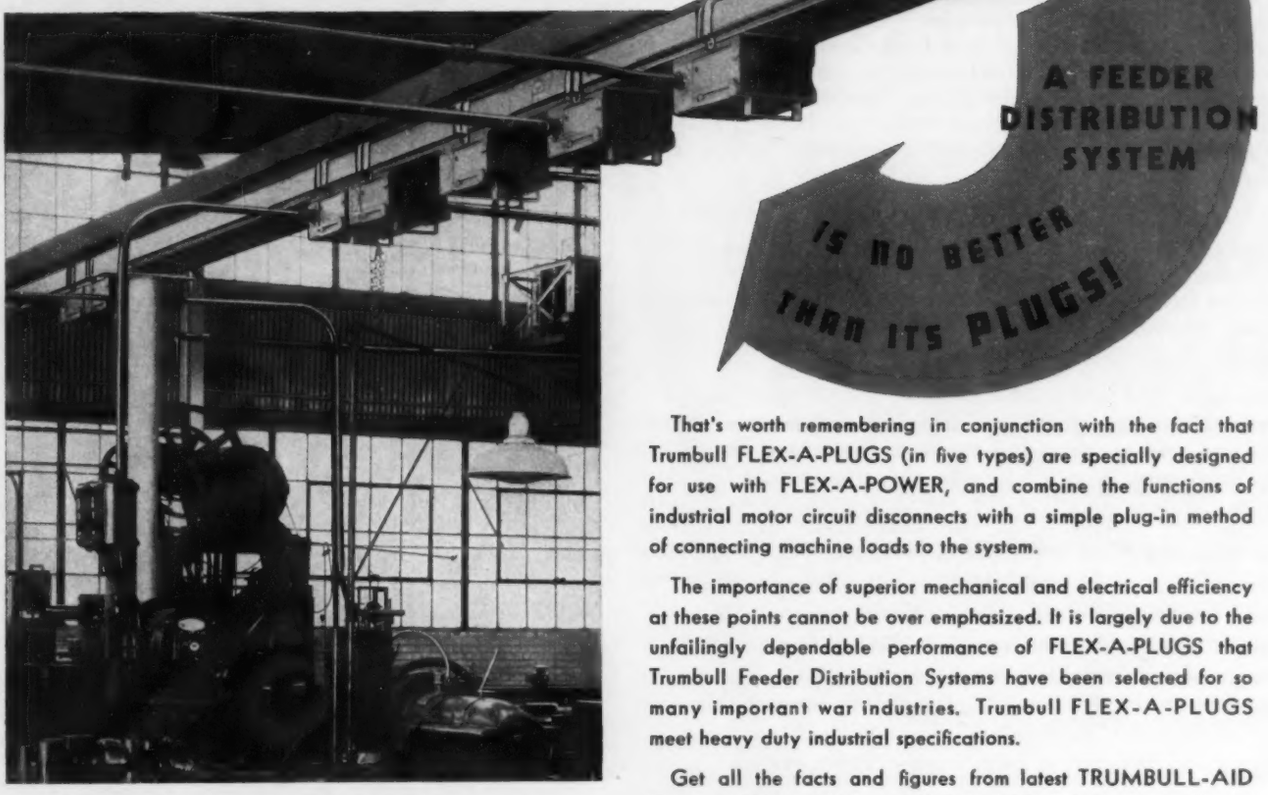
. . . if your plant is equipped with
TRUMBULL FEEDER DISTRIBUTION SYSTEMS

You can ADD new machines as production demands increase, simply by "plugging in" to FLEX-A-POWER . . . "A panelboard running the length of the plant".

You can SUBTRACT machines from one department and add them to another without an hour's loss of time on electrical "hook-ups".

You can MULTIPLY the capacity of your electric power distribution system by quickly installing the new L.V.D. (Low Voltage Drop) BUSS-WA . . . "a switchboard running the length of the plant" . . . for main power supply with minimum power loss.

And when you may have to DIVIDE your facilities with the resumption of normal civilian production, your investment will be protected because both of these Trumbull Systems are completely SALVABLE.



A FEEDER DISTRIBUTION SYSTEM IS NO BETTER THAN ITS PLUGS!

Typical FLEX-A-POWER installation showing how connections to load are made with FLEX-A-PLUGS.

That's worth remembering in conjunction with the fact that Trumbull FLEX-A-PLUGS (in five types) are specially designed for use with FLEX-A-POWER, and combine the functions of industrial motor circuit disconnects with a simple plug-in method of connecting machine loads to the system.

The importance of superior mechanical and electrical efficiency at these points cannot be over emphasized. It is largely due to the unfailingly dependable performance of FLEX-A-PLUGS that Trumbull Feeder Distribution Systems have been selected for so many important war industries. Trumbull FLEX-A-PLUGS meet heavy duty industrial specifications.

Get all the facts and figures from latest TRUMBULL-AID Circulars 328 and 335 and Bulletin 408. Write us or call your nearest Trumbull office.

THE **TRUMBULL** ELECTRIC MANUFACTURING COMPANY
PLAINVILLE, CONN.

THE TRUMBULL ELEC. MFG. CO. — PLAINVILLE CONN. U.S.A.

FACTORIES AT SEATTLE — SAN FRANCISCO — LOS ANGELES

Why your Red Cross now needs

FIFTY MILLION DOLLARS

Every dollar that you give now to your Red Cross marches into the thick of things where humanitarian help is needed most—up to the fronts and battle stations where the fighting is heaviest. And throughout our broad land to train and equip volunteers to meet any emergency that may strike.

How this War Fund is Used

SERVICE TO THE ARMED FORCES $25,000,000
Provides for the care of the Army and Navy, including services to men in hospitals and during convalescence. • Provides an important link between the service men and their families. • Provides essential medical and other supplies outside of standard Government equipment. • Operates Red Cross headquarters at camps and naval stations. • Enrolls blood donors and medical technologists for Army and Navy needs. • Provides millions of surgical dressings, sweaters, socks, etc. through volunteer workers.

DISASTER AND CIVILIAN EMERGENCY RELIEF . $10,000,000
Supplies emergency needs for food, clothing, shelter and medical attention for disaster victims. • Assists stricken families in repair of homes and other adjustments; provides minimum reserves of essential relief supplies to prevent unnecessary delays.

CIVILIAN DEFENSE SERVICES $5,000,000
Trains volunteers for home nursing and nurses' aides. • Trains nurses, men and women, for active duty with the Army and Navy. • Trains volunteers in First Aid and accident prevention, in Motor Corps, Canteen and Production. • Organizes for evacuation of children and their families from stricken areas. • Assists Red Cross Chapters in establishing effective coordination of emergency relief.

SERVICE AND ASSISTANCE THROUGH CHAPTERS . $4,000,000
Gives assistance and service to the 3,740 Red Cross Chapters with their 6,131 Branches responsible for local Red Cross activities.

OTHER ACTIVITIES AND CONTINGENCIES . . . $6,000,000
New activities made necessary by unexpected developments.

TOTAL $50,000,000

THE AMERICAN RED CROSS
$50,000,000 WAR FUND

Note to Red Cross Canvassers: Use this page to inform contributors how their donations are being expended.

Spreader Arm (222)

A new spreader arm is adaptable to any type of overhead luminaire, and offers four important advantages, according to the manufacturer, the Line Material Co. Advantages claimed for the spreader arm are that it minimizes swaying in the wind; assures rigid

mounting, holding the luminaire in the desired position (a special advantage where refractors are used); point of attachment is high and near the center of suspension, minimizing tipping due to weight of leads and wind pressure; reduces maintenance cost of leads by increasing clearance between insulator and reflector and prevents lead wires from laying on 20-in. open type reflectors.

Fluorescent Luminaire (223)

A new 40-watt fluorescent luminaire where extended light lines are desirable has been developed by the Westinghouse Electric & Mfg. Co. to be known as type FPS-40. The luminaire uses 2 or 3 40-watt fluorescent lamps per reflector and will provide lighting intensities up from 30 to 100 footcandles with maximum diffusion and minimum glare at ordinary spacing and mounting heights. According to the manufacturer, the design makes it possible to construct any length of strip desired from four simple and compact types. The channels provide a continuous wireway which may be mounted on conduit, messenger cable, twin-rod suspension or directly on the ceiling. All auxiliary equipment is mounted in the channel. The units have twin-ballasts with built-in compensators providing power factor of 90% or over.

"No-Blink" Starter Switch (224)

A "No-Blink" starter switch which will end a fluorescent lamp's life when it has reached the stage where it blinks on and off has just been developed by the commercial engineering department, Westinghouse Electric & Mfg. Co. Designed specifically for the 40-watt Mazda fluorescent lamp, the new switch will eliminate blinking and flickering of burned-out lamps and starter switches will last longer.

THREE "EXTRA PROTECTION" FEATURES GIVE EVERY TRI CLAD MOTOR . . . GREAT STRENGTH AND LONG LIFE

1 Extra Protection against Physical Damage

ARMORED CONSTRUCTION . . . SMOOTH CONTOURS . . . RIGID ALIGNMENT Strong, one-piece, cast-iron frame and cast end shields, with upper portion completely enclosed, protect vital motor parts from external blows, falling objects, or dripping liquids.

2 Extra Protection against Electrical Breakdown

"FORMEX" WINDINGS . . BONDED COIL UNITS Features for extra protection against moisture, oil, abrasion, and heat-shock.

3 Extra Protection against Wear and Tear

NEW BEARING DESIGN . . . NEW OPERATING SMOOTHNESS Sleeve bearings proportioned and grooved for protective lubrication under severe loads. Sleeve and ball bearings enclosed in strong, dust-tight housings.

a LARGER range of sizes! a WIDER scope of service!

The advanced design and triple-tough construction that won industry's enthusiastic acceptance almost overnight have now been extended to many larger motors in our a-c line.

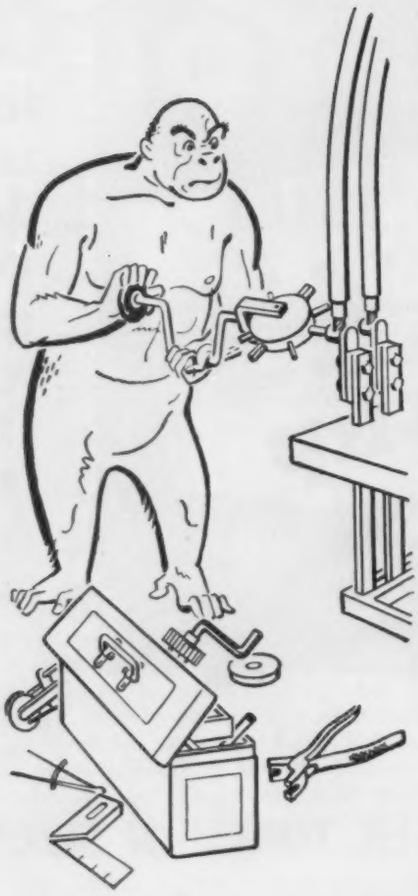
GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.

BUILT FOR PROTECTION FIRST . . . TO LAST!

GENERAL ELECTRIC

750-103-NIGA



Special Tools and Gadgets aren't necessary if you use National Electric "Gorilla Grip" Connectors.

Pliers or standard wrenches are all that are necessary to make a tight, positive connection when "Gorilla Grips" are used. And to make them even more convenient and easier to handle, National Electric has assembled stock sets to meet your particular needs and to suit your plant requirements. Write and ask for particulars.

National Electric
PRODUCTS CORPORATION
1300 Fulton Bldg. Pittsburgh, Pa.

BULLETINS

data books, etc.

Heating Units (225)

Electric heating units and controls for industrial applications involving the heating of liquids, solids or air are described in a recently revised 38-page catalogue announced by Westinghouse Electric and Mfg. Co. Specifications, descriptions, ratings and prices of various type heaters are covered. This booklet contains seven pages of application data and information for determining suitable types and sizes of electric heating units to meet many industrial requirements. Typical examples of heating problems with solutions are included.

FH Cubicles (226)

A pamphlet issued by General Electric Co. emphasizes the more important advantages of FH Cubicles with air-blast circuit breakers and pneumatic operating mechanisms. Photographs and diagrams show the operation of the equipment. A diagram of a typical switching cross section gives cubicle and transfer-bus scheme, with suggested physical locations for current transformers.

Fluorescent Fixtures (227)

DayBrite Lighting, Inc. presents its complete line of fluorescent lighting fixtures in a new 72-page catalogue. The book is divided into four sections, covering commercial, industrial and display lighting and strip lights and accessories. Tables for figuring footcandle intensities for the various type installations are included. Charts in the display lighting section are a guide to window lighting requirements for individual needs. A price list is supplied with the catalogue.

Rheostats (228)

A four-page bulletin from James G. Biddle Co. gives data on Jagabi "Lubri-tact" Laboratory Rheostats. A distinguishing feature of these rheostats, according to the manufacturers, is a graphite lubricated contact, which eliminates wear and gives smooth adjustment. The bulletin describes the Standard Unprotected Type; four with special features; and the Compression Carbon Rheostat for controlling heavy current. Prices of the various sizes and ratings are listed.

Crane Controls (229)

A bulletin issued by Electric Controller & Mfg. Co., describes two new systems of control for A-c cranes—EC&M A-c Dynamic Lowering Control and EC&M Contra-Torque Lowering Control. The systems are made possible by the EC&M Frequency Relay and the manufacturer claims for them results previously impossible to attain on A-c wound-rotor motor equipment. The new bulletin discusses the following: A-c Dynamic or Contra-Torque Lowering, which?; Hoist Control for General Purpose Cranes; Hoist Control for Bucket or Bulk-Material Cranes; Hyper-Synchronous Lowering Speeds; Hoist Control for two-Motor Bucket Cranes; Bridge & Trolley Control.

Voltage Indicators (230)

An illustrated pamphlet describing Airco's complete line of high voltage indicators has been issued by Air Reduction, N. Y. Included are complete construction, installation and operating details of the Type R Indicator and of the two recent additions to the line—Type RC for concentrated glow and Type RS for greater illumination. Photographs of the indicators in actual use and a suggested method of mounting are other features.

Recording Equipment (231)

Recent improvements in Micromax CO_2 recording equipment for flue-gas analysis are described in a revised catalogue issued by Leeds & Northrup Co. The catalogue, which is of particular interest to steam engineers, contains a complete description of the equipment, full-size reproductions of round and strip-chart records and illustrations of installations.

Fluorescent Lighting (232)

A new 35-page booklet, "Facts, Questions, Answers on Fluorescent Lighting in Industry," has been issued by the Westinghouse Lamp division. Prepared for non-technical readers, this booklet answers questions regarding cost, efficiency, advantages and maintenance of fluorescent lighting in industrial plants. The following subjects are covered: Fluorescent Lamps and Accessories; Fluorescent Lamp Equipment; Design of Fluorescent Lighting Installations, Cost of Fluorescent Lighting Installations; Questions and Answers.

Wirewa Combinations (233)

National Electric Products Corp. has produced a colorful booklet on its 4x4 Wirewa units. The booklet is illustrated with actual installations, diagrams and pictures of the items, with specifications.

ELECTRICAL WEST, 68 Post St., San Francisco, California

Please send me the following CIRCLED items:

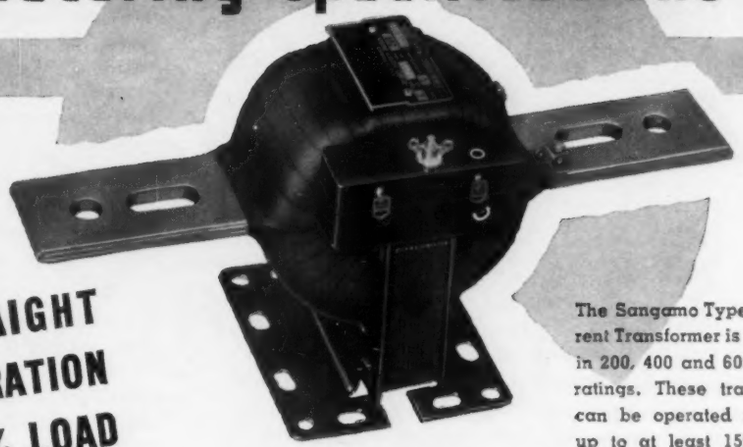
200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228	229
230	231	232	233						

Name ..... Company* ..... Title* .....

Address

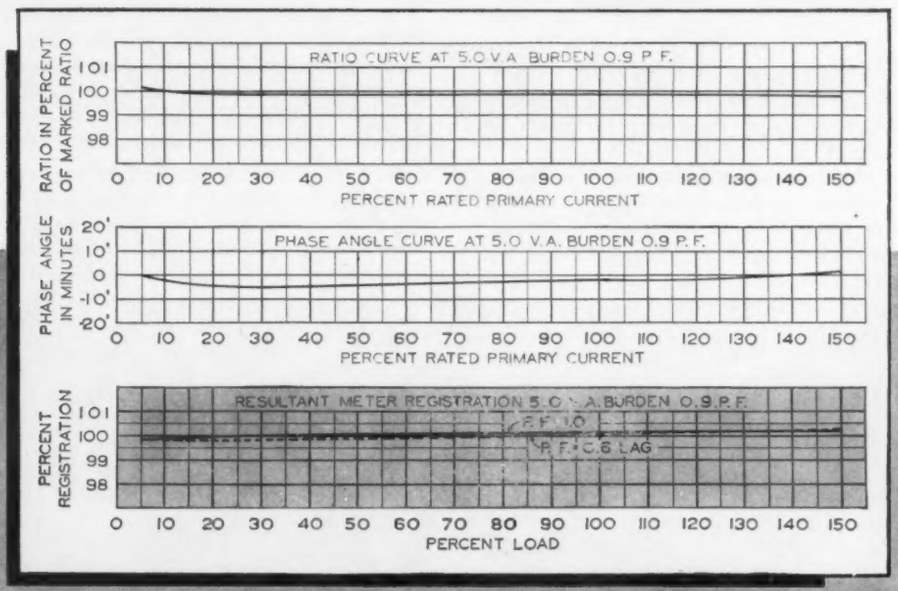
* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

this Sangamo Current Transformer MEETS and EXCEEDS exacting metering specifications



☆ THE RATIO AND PHASE ANGLE CURVES REFLECT A PRACTICALLY STRAIGHT LINE METER REGISTRATION FROM 5% TO 150% LOAD

The Sangamo Type M-6 Current Transformer is available in 200, 400 and 600 Ampere ratings. These transformers can be operated at values up to at least 150% rated primary current without exceeding a 55° C. temperature rise. The one-second thermal rating is 100 times normal current.


RATIO IN PERCENT OF MARKED RATIO
RATIO CURVE AT 5.0 V.A. BURDEN 0.9 P.F.
101
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0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150
PERCENT RATED PRIMARY CURRENT
PHASE ANGLE IN MINUTES
PHASE ANGLE CURVE AT 5.0 V.A. BURDEN 0.9 P.F.
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-10'
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PERCENT RATED PRIMARY CURRENT
PERCENT REGISTRATION
RESULTANT METER REGISTRATION 5.0 V.A. BURDEN 0.9 P.F.
P.F. 1.0
P.F. .6 LAG
101
100
99
98
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150
PERCENT LOAD

☆ The E.E.I. specified a metering current transformer, insulated for 600 volts in 200, 400, and 600 ampere ratings, capable of carrying 150% load without undue heating, and with electrical characteristics which, with a burden of 5 volt amperes at 90% power factor, would not affect the watthour meter accuracy at any power factor from unity to 60%, lagging more than plus or minus ½ of 1%. How the Sangamo Type M-6 Current Transformer meets and exceeds these specifications is shown in the watthour meter registration curve. Even though the variations are small, the ratio and phase angle curves have been so balanced in their individual trends, that they reflect a practically straight line meter registration from 5% to 150% load.

SANGAMO ELECTRIC COMPANY SPRINGFIELD ILLINOIS

Defense Savings Pay-Roll Allotment Plan

How company heads can help their country, their employees, and themselves

voluntary pay-roll allotment plan | helps workers provide for the future; helps build future buying power; helps defend America today

This is no charity plea. It is a sound business proposition that vitally concerns the present and future welfare of your company, your employees, and yourself.

During the post-war period of readjustment, you may be faced with the unpleasant necessity of turning employees out into a confused and cheerless world. But you, as an employer, can do something *now* to help shape the destinies of your people. Scores of business heads have adopted the Voluntary Pay-roll Allotment Plan as a simple and easy way for every worker in the land to start a *systematic* and *continuous* Defense Bond savings program.

Many benefits . . . present and future. It is more than a sensible step toward reducing the ranks of the post-war needy. It will help spread financial participation in National Defense among all of America's wage earners.

The widespread use of this plan will materially retard inflation. It will "store" part of our pyramiding national income that would otherwise be spent as fast as it's earned, increasing the demand for our diminishing supply of consumer goods.

And don't overlook the immediate benefit . . . money for defense materials, quickly, continuously, *willingly*.

Let's do it the American way! America's talent for working out emergency problems, democratically, is being tested today. As always, we will work it out, without pressure or coercion . . . in that old American way; each businessman strengthening his *own* house; not waiting for his neighbor to do it. That custom has, throughout history, enabled America to get things done *of its own free will*.

In emergencies, America doesn't do things "hit-or-miss." We would get there *eventually* if we just left it to everybody's whim to buy Defense Bonds when they thought of it. But we're a nation of businessmen who understand that the way to get a thing done is to *systematize* the operation. That is why so many employers are getting back of this Voluntary Savings Plan.

Like most efficient systems, it is amazingly simple. All you have to do is offer your employees the convenience of having a fixed sum allotted, from each pay envelope, to the purchase of Defense Bonds. The employer holds these funds in a separate bank account, and delivers a Bond to the employee each time his allotments accumulate to a sufficient amount.

Each employee who chooses to start this savings plan decides for himself the denomination of the Bonds to be purchased and the amount to be allotted from his wages each pay day.

How big does a company have to be? From three employees on up. Size has nothing to do with it. It works equally well in stores, schools, publishing houses, factories, or banks. This whole idea of pay-roll allotment has been evolved by businessmen in cooperation with the Treasury Department. Each organization adopts its own simple, efficient application of the idea in accordance with the needs of its own set-up

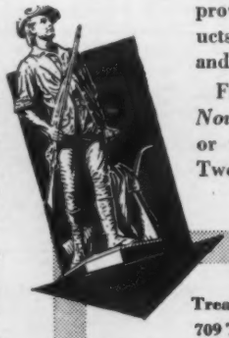
No chore at all. The system is so simple that A. T. & T. uses exactly the same easy card system that is being used by hundreds of companies having fewer than 25 employees! It is simple enough to be handled by a check-mark on a card each pay day.

Plenty of help available. Although this is *your* plan when you put it into effect, the Treasury Department is ready and willing to give you all kinds of help. Local civilian committees in 48 States are set up to have experienced men work with you just as much as you want them to, and no more.

Truly, about all *you* have to do is to indicate your willingness to get your organization started. We will supply most of the necessary material, and no end of help.

The first step is to take a closer look. Sending in the coupon in no way obligates you to install the Plan. It will simply give you a chance to scrutinize the available material and see what other companies are already doing. It will bring you samples of literature explaining the benefits to employees and describing the various denominations of Defense Savings Bonds that can be purchased through the Plan.

Sending the coupon does nothing more than signify that you are anxious to do *something* to help keep your people off relief when defense production sloughs off; *something* to enable *all* wage earners to participate in financing Defense; *something* to provide tomorrow's buying power for your products; *something* to get money *right now* for guns and tanks and planes and ships.



France left it to "hit-or-miss" . . . and *missed*. *Now* is the time for *you* to act! Mail the coupon or write Treasury Department, Section A, 709 Twelfth St. NW., Washington, D. C.

FREE - NO OBLIGATION

Treasury Department, Section A,
709 Twelfth St. NW., Washington, D. C.

Please send me the free kit of material being used by companies that have installed the Voluntary Defense Savings Pay-Roll Allotment Plan.

Name _____

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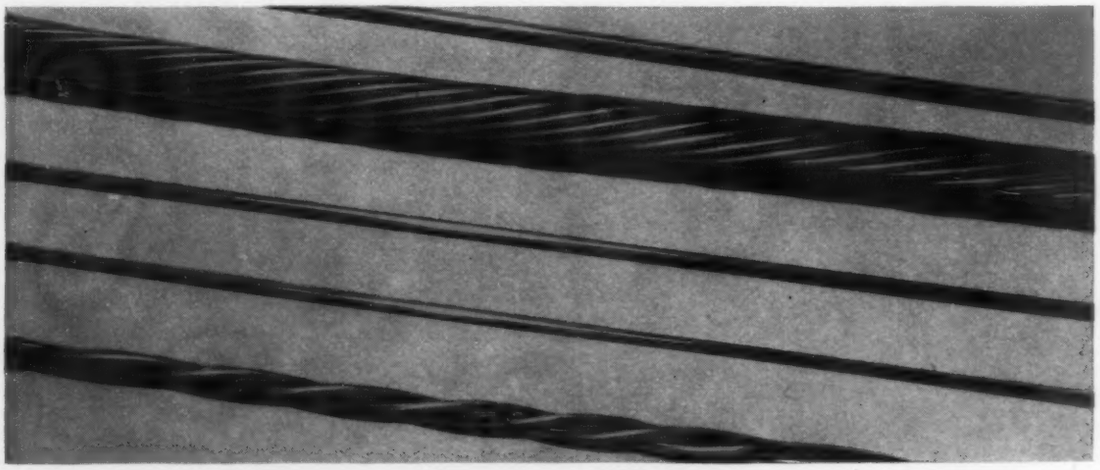
COPPER . . . vital in a thousand ways to defense . . . must be used wisely. For example, using OVERSIZE copper conductors to obtain MECHANICAL strength is wasteful of precious material. The steel core of the Copperweld wire provides mechanical strength in Copperweld or Copperweld-copper Conductors. The copper need only do the job that copper does best—conduct electricity.

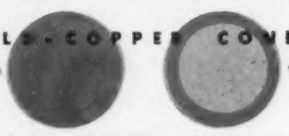
Typical applications of copper-saving Copperweld are: power conductors for electric transmission and distribution systems, telephone line wire, telephone drop wire, telephone interior wiring, railroad signal line wire, railroad telephone line wire, and telegraph line wire.

Copperweld wire may also be used for many mechanical and non-electrical applications where brass or bronze wires have been employed.

COPPERWELD STEEL COMPANY, GLASSPORT, PENNA.



COPPERWELD AND COPPERWELD-COPPER CONDUCTORS CONSERVE COPPER



Pacific Coast Representative: C. E. INGALLS · RIALTO BUILDING · SAN FRANCISCO, CALIFORNIA

How accurate the instrument?

. . . HOW PERMANENT THE MAGNET!

So magnets may defy time . . . here they are being *specially* heat treated . . . just one of the many operations in magnet manufacture all under WESTON control to insure lasting permanency and thus provide *lasting dependability* to all WESTON instruments.

"How come," you say, "that so many WESTON Instruments manufactured ten, twenty or even fifty years ago are still giving dependable service throughout industry?"

For the answer . . . first consider the backbone of these WESTONS. Despite their advanced age . . . the magnets have *remained unchanged* . . . the strength of the magnetic field *remained constant.* Neither time, temperature variations, vibration, nor external demagnetizing influences have had any effect. Thus, with their full strength *"kept in,"* errors due to weakening have been *"kept out."*

The secret of the permanency of WESTON magnets dates back over a half century ago . . . when in the middle 80's Dr. Weston established the basic principles of design, and manufacturing control, which first gave the iron horseshoe perpetual magnetic life. And it is these same fundamental principles which still give magnets this essential quality of permanency . . . even when modern materials are employed.

So today, at WESTON, these same basic principles are faithfully carried out . . . to give magnets the *same lasting permanency* . . . to provide the *same life-expectancy* . . . to all instruments which bear the WESTON name. Weston Electrical Instrument Corporation, 577 Frelinghuysen Avenue, Newark, New Jersey.

WESTON

Instruments

LABORATORY STANDARDS . . . PRECISION DC AND AC PORTABLES . . . DC, AC, AND THERMO SWITCHBOARD AND PANEL INSTRUMENTS . . . INSTRUMENT TRANSFORMERS . . . SENSITIVE RELAYS . . . SPECIALIZED TEST EQUIPMENT . . . LIGHT MEASUREMENT AND CONTROL DEVICES . . . EXPOSURE METERS . . . AIRCRAFT INSTRUMENTS . . . ELECTRIC TACHOMETERS . . . DIAL THERMOMETERS

WESTERN REPRESENTATIVES

Seattle, Wash.	San Francisco, Calif.	Los Angeles, Calif.	Denver, Colo.	Phoenix, Ariz.
Eicher & Bratt,	Herman E. Held,	Edward S. Sievers.	Howard Peterson,	J. E. Redmond Co.,
262 Colman Bldg.	420 Market St.	417 So. Hill St.	1921 Blake St.	448 W. Madison St.

Less WONDERING, WISHING, WORRYING, WATCHING

With L-M ROUND-WOUND Transformers you have greater peace of mind because they give you higher short-time overload capacity, uniformly high impulse strength and greater mechanical resistance to short circuits.

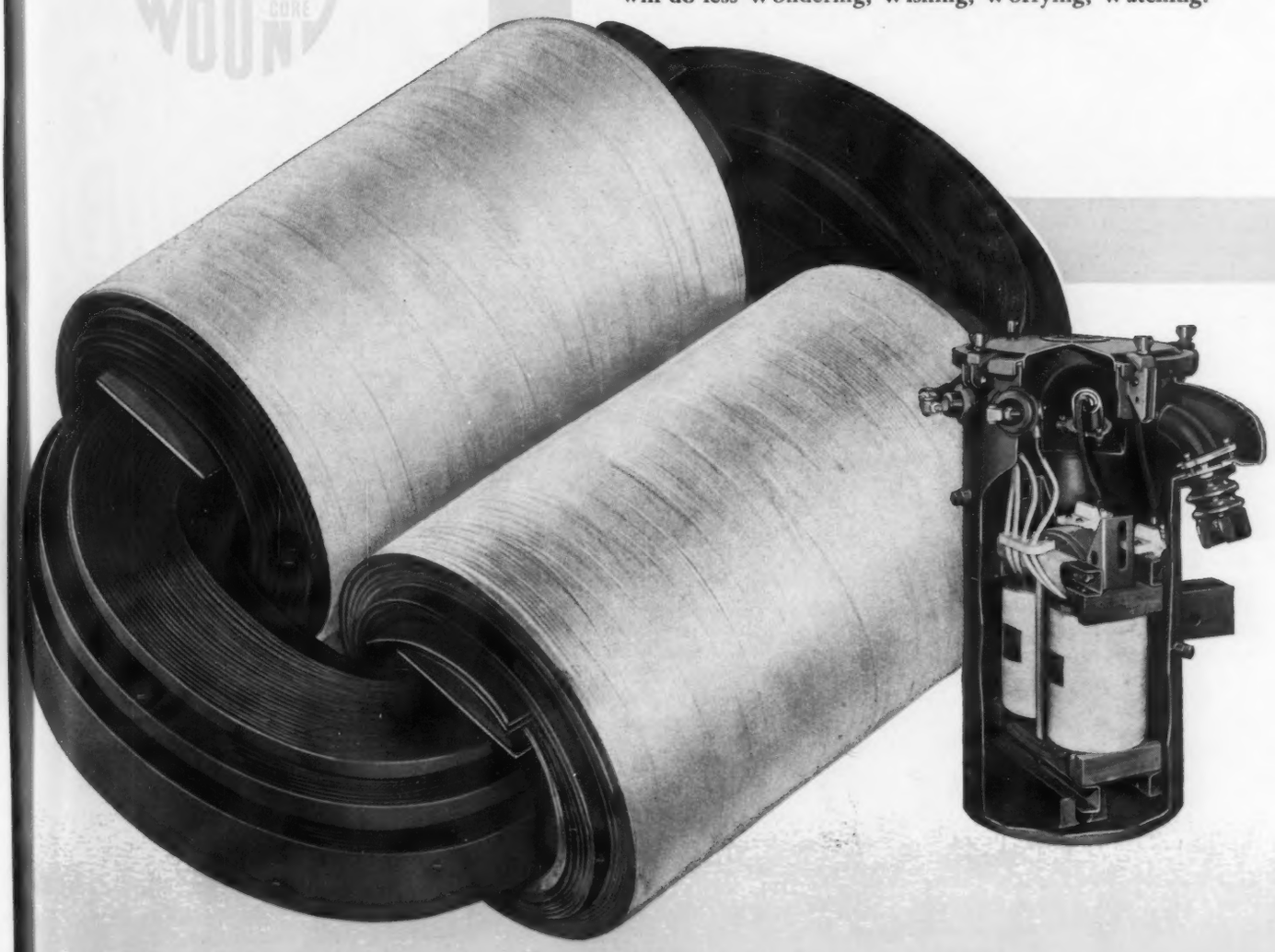
The large radiating surfaces of the two long, round coils, almost completely in contact with free oil, readily and speedily dissipate heat. The ROUND-WOUND naturally has a higher short-time overload capacity.

Winding round coils eliminates all sharp bends, relieves wire tension and does away with the tapping mallet which can damage the wire and insulation in conventional coil winding. The result is uniformly higher impulse strength.

Short circuits tend to form coils into a round shape. By having round coils to start with — the logical shape — the L-M ROUND-WOUND is mechanically stronger to withstand short circuit conditions without damage.

If you install L-M ROUND-WOUND Transformers, you will do less Wondering, Wishing, Worrying, Watching.

ROUND COILS WOUND CORE



LINE MATERIAL COMPANY

ELECTRA'S HUSBAND

Priority Trouble at Home

"YOU KNOW I've always liked Joe Blaine," Electra said the other night as she sat mending Junior's corduroy pants, "but if he breaks into our bridge game just once more with some crack about priorities, I won't be responsible for the consequences."

"Now honey, you just don't understand," I remonstrated because from the gleam in her eye, I knew that there was rough weather ahead.

"Don't understand?" she broke in. "After all I finished three years of college before you induced me to change my name. And I can read. But to hear Joe expound with his smug familiarity on the subject of priorities, you'd think that he has read the regulations and understood them all. Which I am thoroughly convinced, he has not."

"But he knows a lot about it," I said trying to calm her down. "Every business man must know plenty about priorities, if he is going to stay in business."

"That may be right, but he also wants to exercise his imagination," she said. "This is an emergency. And we are not going to win any wars or come through them with colors flying if we accept some of these edicts as self-evident truths and then sit back and wait for the worst. Why when Joe made that crack about supposing priorities on copper were going to put a lot of us people in the electrical industry out of business, I could have slapped him down. And you didn't say much in defense. You reminded me of the executive who made a high sounding speech that is reported in one of your business magazines you left lying around. I saved it for you. Read this."

She handed me a magazine from the pile on the table at her elbow. It was opened at a page headed "Priorities and the Consumer in 1942." I began reading:

"The affair at Pearl Harbor gives us a wholly new outlook for 1942. This year we are confronted with a blank wall, but backed up with our rear guard, we are siding in with the open door policy through which we glimpse the bulwark of our backlog. Overshadowed by the price ceilings on fundamentals, we will follow through with an eye on the main chance, our ear to the ground. With the situation well in hand, we're bound to get ahead by the skin of our teeth, not to say a hairbreadth escape; but only as long as we keep a finger on the pulse of the public. Notwithstanding the seat of our pants wearing out, due no doubt to making so many contacts, hatching out plans for leveling off production, we nevertheless are fully prepared to meet all contingencies. Hampered only by such imponderables as the upward revision of price differentials which are practically negligible, not to say in relatively better shape than other industries confronted with problems under curtailed output or consumption of production, we may be under freezing orders. But of course it is entirely possible that the emergency will be curtailed which of course would make necessary an entirely new delineation and interpretation of the situation."

That may be stretching the facts some, but it is close enough to the text to indicate how meaningless the discourse was.

"Yes, that's exactly how you and your friend Joe sound," Electra said when she saw that I had finished reading. "There ought to be more action and a lot less talking.

"Suppose the electrical industry is going on a copper budget? Will it cripple everyone in the business? A lot of you men might ask your wives what to do. Wives have managed budgets ever since you married them. They have always had to work within limitations. Like a lot of Chinese, they know the meaning of 'can do.' If I didn't I wouldn't be sitting here patching Junior's pants for the fourth time.

"You men seem to like to sit on a cactus and howl. From all I can learn about these priorities, you're not required to make bricks without straw—it's just that the quota of straw has been reduced. When a housewife is confronted with such limitations, she doesn't sit around and say that it's impossible to bake a cake. She inventories stock, and adjusts the recipe to what she has."

"Is that why some of your cakes taste the way they do?" I cut in.

"You keep still until I finish or I'll wait until Joe is here and tell both of you off. Any dodo can manage any kind of a job with complete equipment. It takes a real craftsman with pride in his work to manage a good job when he is short of tools or materials. Think that one over and then begin exercising some of the Yankee ingenuity you are supposed to have inherited from your New England ancestors."

"You just wait until you have to get a PD-1 priority the next time the water heater goes on the bum," I interposed. "Then you'll learn about priorities."

"Oh, no I won't," she chuckled. "While you were away last week I bought a new one."

Even though I wanted to, this was no time for me to laugh.

WE WERE at lunch in one of the close-by eating places when my companion, an engineer with one of the Coast's large industrial organizations, said:

"See the partly bald chap who just walked in? There's a story about him you might use some time. You'd guess him close to fifty, wouldn't you? Well that's about right. Fourteen years ago he was a conductor on a street car. He suddenly decided that there were better jobs than ringing up fares. So he enrolled in the State University—took an engineering course. He continued as a platform man nights because he had to work to stay in school. He finished a five-year course in four—with honors. Then he went to Blank Company for a job. They started him at the bottom with a field gang. He caught on quickly and soon was a party chief. Then they put him over in the construction division. He did that job well. He finished a stretch in engineering, and finally was assigned to production. He's been there ever since. He did a tour of duty down in South America. Now he's headed for the top—just made assistant manager of production for the whole company. And he has done it on sheer ability—coupled with a lot of initiative. He hasn't stepped on anybody's toes and he has made friends every step of the way. It's something that could only happen in the United States of America, isn't it?"

He was right. It could only happen here in America. It's that kind of opportunity for which we are willing to fight—the Japs, the Dictators, the rest of the world if necessary. It's that kind of an opportunity that we hope will be preserved when we come out of this worldwide war.

There is no unguarded moment in Anaconda's "control" research; the war program and our industry can thus count on the uniform dependability in every Anaconda wire and cable.

KEEN-MINDED technicians peer intently into metallographic microscopes, day in and day out, watching, watching to see that flawless metals go into every Anaconda wire and cable that is delivered to war-vital work.

Unceasing control like this has earned its "keep". For, throughout industry and now in the army and the navy, users have learned they can lean heavily on the dependability of wires and cables bearing the Anaconda trade-mark. And that isn't all.

They have recognized Anaconda research as a source for many product improvements and for many completely new developments . . . such as Type CB* construction that outlasts ordinary shielded paper-lead cable three to one. This research is a boon to our war effort . . . it will be equally valuable to industry with the return of peace.

*CB—Trade-mark Reg. U. S. Pat. Off. 42243

ANACONDA
from mine to consumer

This familiar trade-mark symbolizes the best efforts of modern research and production.

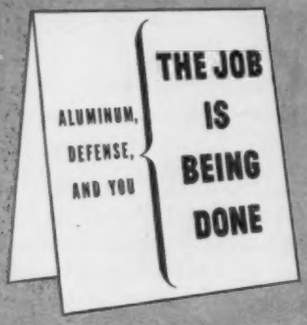
ELECTRICAL WIRES AND CABLES OF COPPER ARE THE LIFE LINES OF OUR NATION

ANACONDA WIRE & CABLE COMPANY

Subsidiary of Anaconda Copper Mining Company

GENERAL OFFICES: 25 Broadway, New York City • CHICAGO OFFICE: 20 North Wacker Drive • Sales Offices in Principal Cities

THERE IS NO PRIORITY ON IMAGINEERING



EVERY INDUSTRY, every responsible man in industry, has the present duty of answering two questions.

FIRST ONE IS: Are we, am I personally, doing everything within my power for the war? Our answer here at Alcoa is a plain, unqualified, yes.

NEXT QUESTION IS: What are we doing about the day when we will all need business, which is the polite way of saying, when millions of jobs will be needed for the boys who come back, and for the boys who stayed back to make the weapons.

IMAGINEERING, you know, is the word we have coined to define what we business people have all got to do about the future; about the products we are going to make and the services we are going to be able to offer when this war is over. Imagineering is imagination plus engineering.

HOW DO YOU DO IT? One way would be to figure out, now, how to take advantage of all the aluminum that is going to be available.

QUICKEST WAY TO GET AT IT is to take one of your products or a piece of equipment that "just couldn't" be made of aluminum, and ask yourself, Why not?

MEANING, OF COURSE, why not light; why not stronger for the same weight; why not resistant to corrosion, and so on, ad infinitum. The first man in any line of business who calls tradition a liar, and things-as-they-are a millstone, is the man who is going places; the man who is going to make peacetime pay rolls.

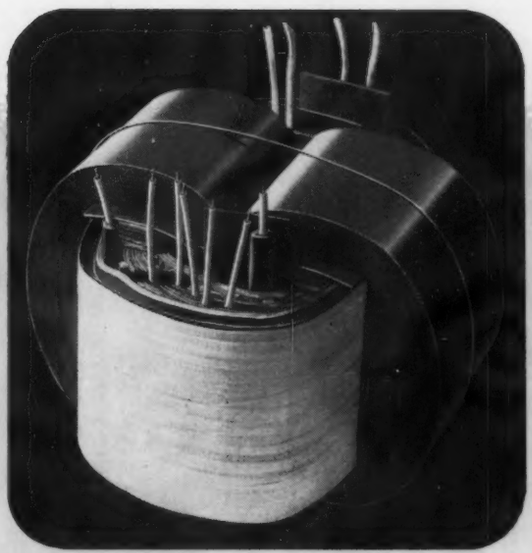
THAT'S IMAGINEERING AT WORK. We've got some ideas here at Alcoa. We're trying to pass them out. We are looking for men who have made themselves receptive by doing some solid Imagineering on their own hook, in their own fields.

Aluminum Company of America, 2132 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

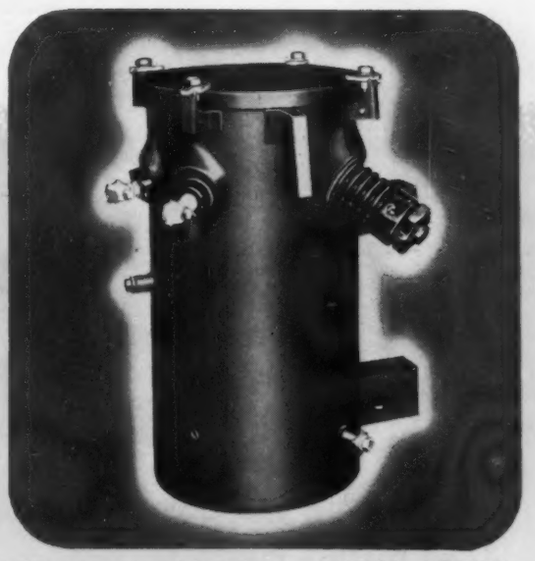
Photoquiz No. 1

ON KUHLMAN DISTRIBUTION TRANSFORMERS



Q. What are the advantages of the Kuhlman B. I. Core?

A. This type of core construction (1) best utilizes the directional magnetic characteristics of the steel, (2) minimizes joint effect and (3) uses material economically. These factors make possible a design resulting in lower exciting current, lower hysteresis losses, lower impedance and better regulation.



Q. What are some of the advantages of Kuhlman Tanks?

A. Formed from copper bearing steel and porcelain enamelled, Kuhlman tanks guard against rust and corrosion and eliminate the need for periodic painting. Pockets for primary and secondary bushings are pressed into the tank—not welded. Large lifting lugs greatly facilitate handling.

Q. What do Linemen think of Kuhlman Transformers?

A. Linemen prefer Kuhlmans because (1) they are lighter, easier to handle, easier to install, (2) they stand up on the job and require no painting, (3) they are built to E. E. I.—NEMA joint committee standards.

Q. Why should you have the new Kuhlman Bulletin 413?

A. Because it clearly describes improvements in Kuhlman Distribution Transformers (1½ through 25 Kva.) It contains the specifications and prices necessary in the buying of transformers. Write for your copy.

In addition to Distribution Transformers, Kuhlman builds a complete line of Sat-T-Kuhl, Power, CSP, and Dry Type Transformers and Line Regulators. It will pay you to get the facts about these units which are the result of Kuhlman's fifty years experience in the building of efficient transformers.

Kuhlman

WESTERN REPRESENTATIVES OF THE KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN

Denver, Colorado Peterson Company 1921 Blake Street	Los Angeles, Calif Thomas Machinery Co. 912 East Third Street	San Francisco, Calif Paul S. Everley 329 Minna Street	Portland, Oregon W. J. Cottrell Security Bldg. 131 S. W. Fourth St.	Phoenix, Arizona L. Vernon Wilson 604 Title and Trust Bldg. P. O. Box 1382

● Hazards aplenty exist for radio-proof insulators—corrosive chemicals, heavy leakage currents, flashovers followed by power arcs, high charging currents, and thermal shocks. And an insulator, to be a *permanent* radio noise eliminator, must be able to withstand all such influences. O-B Silentypes definitely resist these potential trouble-makers, and the reason is that their conducting underglaze is protected by an outer glaze. To prove the effectiveness of O-B's radio treatment, Silentypes were given several punishing tests. They were exposed for 125 hours to the powerful digestive fumes from hot concentrated sulphuric acid. They were burned for 100 hours with a leakage current of 50 milliamperes (fifty to a hundred times greater than experienced in normal service). They were given very severe flashovers in which power arcs were prolonged. They were tortured with thermal shocks. And they were subjected for 1,500 hours to overvoltages (two and a half times normal line-to-ground) and their accompanying high charging currents. Checks after each of these grueling tests revealed that the radio characteristics were not affected—that the units still had their original high noise-influence levels. To make sure your lines will remain permanently quiet, remember these tests—and specify O-B Silentypes.

Ohio Brass (OB)

MANSFIELD, OHIO

2330-H

Canadian Ohio Brass Company, Ltd., Niagara Falls, Ont.

★ ★ ★

ELECTRICAL WEST

VOL. 88 NO. 2
FEBRUARY, 1942

THIS YEAR OF WAR

Official U. S. Navy Photograph

A YEAR AGO this page carried the heading, "This Year of Grace." As predictions go, it proved accurate to within a matter of days. The period of grace lasted until December 7. Throughout 1941 the defense tempo in the Far West quickened, as demand piled on top of demand for additional production of ships, planes, food, munitions, raw materials—things in which the West stands pre-eminent. And the electrical industry met each new demand—power was ready for plants, contractors were set to wire cantonments or factories, manufacturers and wholesalers were prepared to make deliveries, although as the months rolled along shortages of some materials became critical.

So declaration of war did not materially affect the electrical industry here in this region. It simply called for an immediate transition from a defense status to a war status. More security measures to preclude possible sabotage. Blackouts with their attendant problems of control and curtailment of lighting. A speeding up of facilities in tune with the new war tempo. The dropping of some non-essentials for the duration. A re-study of the whole load-building and appliance selling picture. Re-adjustment of material and equipment distribution to an almost 100% priority or allocation basis.

None of these were measures too stringent or too severe to be taken if they would help in the primary task—the winning of the war. That became all-important and will remain all-important until accomplished. It is a task to which the electrical industry has dedicated itself, as its power houses turn out increasing quantities of the vital energy needed to turn the wheels of munitions plants. As its factories, from which rolled countless devices and appliances to provide human comfort and health and happiness, now are converted to producing instruments of death and destruction. As its manpower drops civilian dress for the garb of war. As all its people prepare to pay in sacrifices, in taxes, in greater effort, the full price of victory.

In retrospect, what was accomplished in that "Year of Grace?" Let's look at the record of performance: Humming generators in almost four thousand power plants poured into transmission and distribution networks more than 26½ billion kilowatt-hours, reflecting a steady month-by-month increase in demand. The total—10.5% more than in 1940—capped all previous production. It reflects the growth in population, in new industries and new services, both normal and defense, that occurred during the year. It shows, too, the vigor of the industry's sales promotion and sales ability. It gives graphic proof of the comparatively greater electrification in the West than elsewhere in the U. S. Average kilowatt-hour production per customer for this region was 6,415 as compared with the national figure of 5,360. Similarly Western

Table I—Comparison of Western to National Operations For 1940 and 1941

	11 Western States		United States		Percent West to U.S.	
	1940	1941	1940	1941	1940	1941
Energy Generated (Millions of Kwh.)	24,017	26,567*	144,985	162,762*	16.7	16.3
Energy Generated in Hydro Plants (Millions of Kwh.)	20,578	23,306*	47,753	50,712*	43.2	45.9
Energy Generated in Fuel Plants (Millions of Kwh.)	3,439	3,261*	97,232	112,050*	3.5	2.9
Percentage of Hydro to Total Generated	85.7	87.7	32.9	31.2	——	——
Installed Generator Capacity (Kw.)†	6,470,691	6,849,160	41,638,956	43,491,371	15.5	15.7
Installed Hydro Capacity (Kw.)†	4,287,528	4,571,207	11,675,300	11,949,170	36.7	38.3
Revenue From Energy Sales (Thousands of Dollars)‡	328,000	358,000	2,440,218	2,670,450	13.5	13.4

* Twelve months ending November. † Source: Federal Power Commission. ‡ Data from EEI.

Table II—Ten-Year Generation Record For Western Public Utilities

(Thousands of Kilowatt-hours)

State	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941*
Arizona	404,319	280,898	295,668	344,939	377,797	510,483	717,825	696,787	1,327,485	1,404,299	1,469,556
California	8,794,742	7,948,447	8,029,298	8,561,951	9,060,296	10,091,716	9,632,178	9,426,519	9,403,588	9,788,869	10,209,796
Colorado	528,813	478,263	459,493	506,710	549,157	652,404	721,482	731,395	760,445	791,967	806,212
Idaho	796,354	584,989	594,528	685,069	672,466	796,430	972,212	992,278	1,126,518	1,175,305	1,143,811
Montana	965,990	635,093	922,814	867,504	1,296,199	1,452,390	1,319,637	1,324,151	1,575,016	1,769,124	2,126,613
Nevada	19,067	32,749	24,271	32,152	27,719	171,499	1,152,788	1,491,205	1,855,042	2,324,176	2,442,575
New Mexico	179,658	157,614	157,482	173,229	190,744	214,602	255,378	262,124	281,508	316,862	364,633
Oregon	1,176,988	969,031	965,847	1,002,338	1,083,818	1,250,421	1,392,177	1,253,615	1,484,468	1,739,903	2,833,028
Utah	276,471	275,476	237,399	206,706	309,835	418,194	507,415	340,172	425,474	577,641	575,774
Washington	2,572,152	2,486,746	2,438,824	2,747,366	2,981,621	3,273,148	3,734,715	3,400,683	3,642,610	3,944,184	4,380,928
Wyoming	94,539	84,646	78,964	81,856	93,779	114,755	131 139	139,205	141,135	184,701	214,046

* F P C reports for 12 months ending November.

generating capacity works longer—the 1941 average kilowatt-hour output per kilowatt of installed capacity was approximately 4,000 for the West as aaginst 3,800 far the whole nation.

Examination of Table I will reveal further significant facts about 1941 electrical trends. It shows for instance that the West is still preponderantly a region of hydroelectric power. Almost 88% of all power developed in this region came from hydro stations, for one reason because 1941 was a good water year. Sole exception was the Pacific Northwest where for a few months during the summer, stream flow was down. Table I reveals furthermore than in percentage of total water power developed in the U. S. the West continues to forge ahead. This region now has 38.3% of all harnessed water power in the nation, and utilizes 45.9% of all of the hydro power generated.

The electrical stature of each of the Western states is revealed in Table II, which shows how energy production has developed in the last decade. One interesting revelation is the degree to which Nevada and Arizona now supply energy to California from Boulder Dam. California's 10,209,796,000 kwh. production for 1941 is only slightly more than the 10,091,716,000 kwh. generated in 1936. However, Nevada production is up from 171,499,000 kwh. in 1936 to 2,442,575,000 kwh. last year, while Arizona generation rose from 510,483,000 kwh. to 1,469,556,000 kwh. in the same period.

More than 169,000 new customers were added to utility lines, principally in the residential classification. More than 45,000 of these were in Los Angeles county alone, where housing for defense workers has been built at a record rate. Unfortunately Table III does not give a clear picture of customer growth during the last year. The classifications are in accordance with FPC definitions. Because of this, some customers formerly listed as residential now appear as "rural." This latter classification no longer applies solely to farm tenancies, but now includes "all customers served at strictly rural rates." Farms receiving rural service in the 11 Western states, as reported by the REA for June 30, 1941, last date for which figures are available, together with the percentage of farms electrified, follow:

State	Farms Electrified	Percent of Total Farms
Arizona	6,300	34.1
California	111,000	83.7
Colorado	18,600	36.2
Idaho	29,900	68.5
Montana	8,700	20.8
Nevada	1,650	46.2
New Mexico	5,300	15.5
Oregon	44,500	72.0
Utah	18,500	72.8
Washington	61,000	74.7
Wyoming	4,200	28.0

Generating capacity to speed the war effort in the 11 Western states increased 379,000 kw. during 1941 (see Table IV), with even greater increases in prospect for 1942 and 1943. New steam plants included two of the 50,000-kw. oil refinery stations of Pacific Gas and Electric, a 22,500-kw. plant of the Salt River Valley Water Users' Assn., 7,500-kw. units for Mountain States and Southern Colorado Power, the two southern California outdoor stations—10,000 kw. at Burbank and 20,000 kw. at Glendale—and a 7,500-kw. unit at Eugene, Ore. Hydro installations included the first 108,000-kw. Grand Coulee unit and another 82,500-kw. machine at Boulder Dam for the Los An-

geles Bureau of Power & Light. For 1942 the total new capacity to be provided is 585,000 kw. divided 105,000 kw. in steam and 480,500 kw. in hydro. Of the hydro 270,000 kw. will come from Grand Coulee and Bonneville. The prospective new capacity now in sight for 1943 operation totals 700,000 kw., excluding power from Shasta Dam.

Such figures as these should set to rest any fears that there may be a shortage of power for war production in this region, The available reserves plus the new capacity in sight are sufficient to provide ample power for any new war industries that may be located here.

In addition to the material presented in these tables there is much relevant data regarding the state of the industry and its various branches in 1941 and 1942 in other pages of this issue.

Additions to physical plant facilities —power houses, substations, transmission and distribution lines—made by forty private and municipal electric systems in this area last year required $78,800,000 in expenditures. This was exclusive of money spent on governmental power projects. For 1942 these same systems have budgeted $89,350,000 for new facilities. Practically all of these have a war production angle, because unless such is the case there will be no materials available. However, in addition to these expenditures some $93,000,000 will be spent by federal agencies on power developments, including Bonneville, Grand Coulee, Boulder Dam, the Central Valley Project and others.

Wartime restrictions on electrical appliances and merchandise will make 1942 in sharp contrast to 1941 when more energy-consuming devices were sold in this region than in any other year in its history. Electrical merchandise sales in the Far West totalled $160,000,000 in 1941 and included more than 87,000 electric ranges, 430,000 electric refrigerators and 252,000 washers. Present stocks of appliances in the hands of dealers and distributors will carry sales along at normal rates for a minimum of six months and in some territories even longer. Emphasis is being placed upon lighting because this equipment will continue to be available. Despite merchandise shortages in some lines, promotional efforts will continue in most territories because appliances now in use must be kept in service and public interest maintained.

In 1941 Far Western building totals reached almost $1,250,000,000—a history making total. Amout one-third of this represented housing to provide for the more than 500,000 new population. Of the $825,000,000 of non-residential construction, more than $215,000,000 was for army and navy construction. However the major portion —some $450,000,000 was for industrial construction, including such items as $290,000,000 for new steel, aluminum, magnesium and machinery facilities. Shipyard expansion ran $65,000,000; aircraft manufacturing, $22,000,000.

All of this adds up to a significant observation: Concealed in the overall current statistics of Western business is the beginnings of a revolution—a revolution as startling as that which accompanied the discovery of gold in the Far West. It is a revolution in the Western economy whereby the former preponderantly agricultural features are being retained, but on top of them is being imposed a basic industrial plant that will have a material effect on the future of Western business. The defense program started the production of the basic industrial raw materials which the region has largely lacked. Now the war program has intensified it. These basic industrial facilities, once they have contributed their share to the victory for which we are fighting today, will remain to contribute to the prosperity that can follow.

Table III—Utility Customers by Classes For 1940 and 1941

State	Rural Customers 1940	Rural Customers 1941	Residential Customers 1940	Residential Customers 1941	Commercial and Industrial 1940	Commercial and Industrial 1941	Municipal, Rail and Miscl. 1940	Municipal, Rail and Miscl. 1941	Total Customers 1940	Total Customers 1941
Arizona	1,431	1,400	85,301	90,000	16,138	16,180	318	320	103,188	107,900
California	71,113	260,000	1,820,121	1,800,000	392,555	380,700	11,608	12,300	2,295,397	2,453,000
Colorado	8,422	12,500	204,060	209,000	45,668	45,800	587	900	258,737	268,200
Idaho	4,137	4,900	103,061	111,000	17,754	19,970	1,457	1,480	126,409	137,350
Montana	0	0	104,072	104,000	17,656	17,690	1,404	1,410	123,134	123,100
Nevada	0	0	21,876	25,100	4,697	5,250	45	50	26,618	30,400
New Mexico	4	0	39,383	51,300	9,904	11,750	207	250	49,498	63,300
Oregon	8,701	10,000	259,318	270,000	46,254	48,220	1,658	1,480	315,931	329,700
Utah	587	700	117,586	125,000	13,105	14,210	900	990	132,178	140,900
Washington	19,828	23,000	442,786	470,000	71,769	75,000	2,449	2,700	536,832	570,700
Wyoming	359	400	40,143	42,000	7,791	8,090	103	110	48,396	50,600
11 Western States	114,584	312,900	3,237,707	3,297,400	641,291	642,860	20,736	21,990	4,016,318	4,275,150
United States	685,812	988,220	24,951,906	25,971,570	4,438,160	4,476,280	115,123	117,060	30,191,001	31,553,130

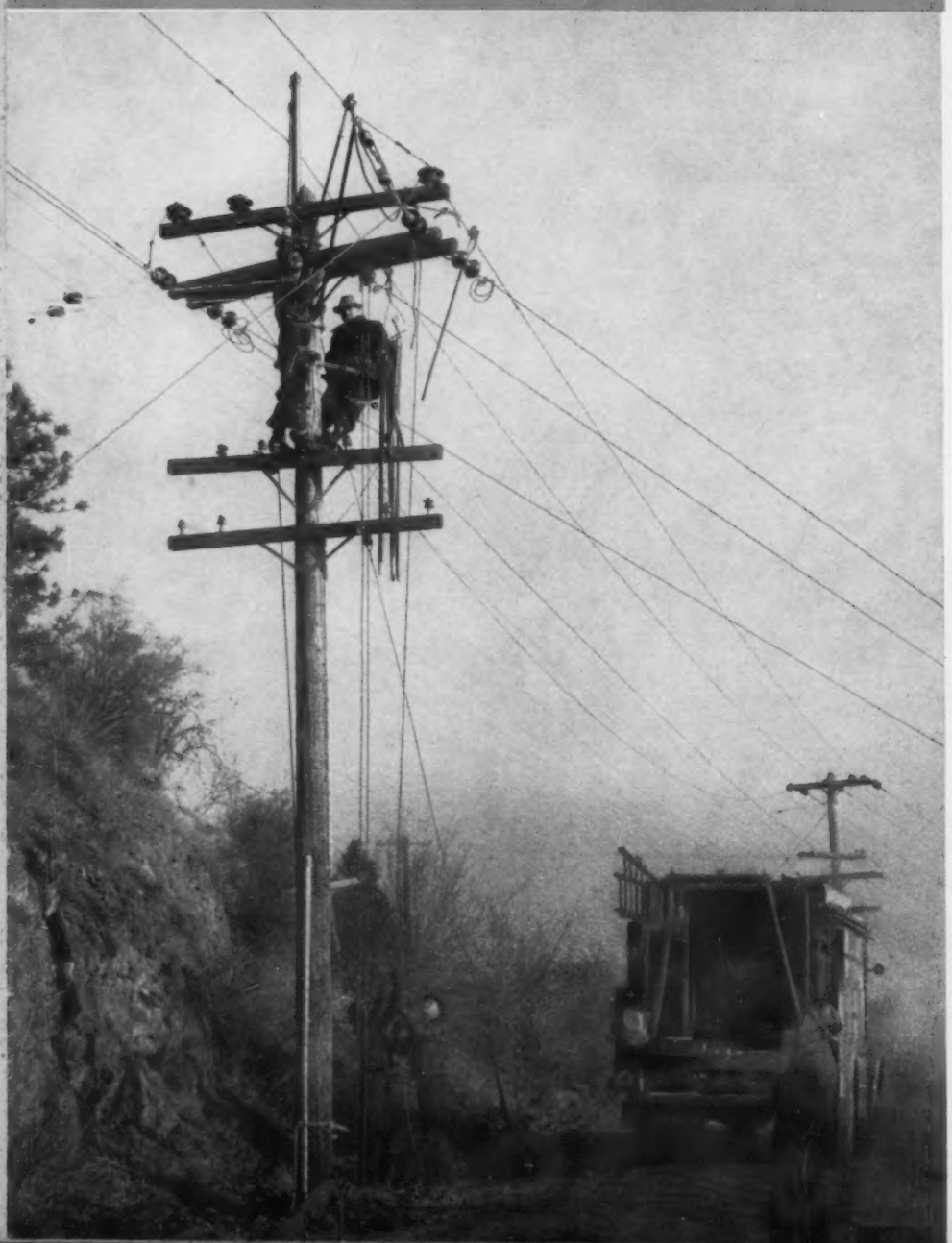
Source: Edison Electric Institute. 1941 based on 10 months' data. Losses in general due to reclassifications. "Rural" includes only those customers having distinct rural rates.

Table IV—Type and Capacity of Utility Generators, November, 1941

State	Companies*	Plants	Total Capacity Kw.	Generator Capacity of Plants Operated by One Type of Prime Mover: Water Power No.	Water Power Kw.	Steam Power No.	Steam Power Kw.	Internal Comb. Engines No.	Internal Comb. Engines Kw.	Combination of Two or More Types: Total No.	Total Kw.	Water Power Kw.	Steam Power Kw.	Int. Comb. Engines Kw.
Arizona	23	47	516,083	13	375,575	7	86,210	19	26,103	8	28,195	40	80,477	19,678
California	35	157	2,765,032	113	1,504,515	29	1,157,050	11	36,422	4	31,045	18,050	...	12,995
Colorado	38	81	290,804	22	64,682	28	209,101	24	14,108	7	2,913	1,468	425	1,020
Idaho	18	49	263,054	37	256,714	2	650	4	1,729	6	3,961	2,710	...	1,251
Montana	14	30	336,629	18	321,385	3	9,850	7	1,960	2	3,434	180	2,368	886
Nevada	8	13	509,416	7	503,350	..	.....	3	2,410	3	3,656	540	2,500	616
New Mexico	19	39	144,125	2	24,380	11	97,245	23	16,015	3	6,485	777	2,634	3,074
Oregon	33	76	633,188	45	439,852	18	184,950	7	1,391	6	6,995	2,500	300	4,195
Utah	26	66	169,216	48	88,802	3	66,250	6	4,184	9	9,980	3,990	...	5,990
Washington	33	71	1,133,130	50	908,180	13	217,500	7	7,340	1	110	30	...	80
Wyoming	29	42	88,488	10	47,772	16	32,960	10	4,189	6	3,567	2,080	677	810
11 Western States	276	671	6,849,160	367	4,571,207	130	2,061,766	121	115,851	55	100,241	32,365	17,381	50,595
United States	1,786	3,872	43,491,371	1,399	11,949,170	1,124	29,777,436	1,132	846,276	217	918,489	266,683	504,098	147,708

1941 Power for Defense —1942 Power for War

Construction programs for private and municipal systems for 1942 show 13.4% increase; budgets total $89,350,000 with additional federal power expenditures of $93,000,000 scheduled for West; plans aimed at maximum generating capacity for war production; all developments geared to wartime realities as regards materials



Lines crews of The Washington Water Power Co. are performing a hot-line reinsulating job in the picture at the left

SO THAT there will be ample power for the maximum war production effort here in the Far West in 1942, there will be spent $182,350,000 on the fifty major electrical systems and projects located in this region. Forty-one private and municipal electrical systems have budgeted $89,350,000 for new facilities—an increase of 13.4% over actual expenditures in 1941. The remainder—$93,000,000—will be expended on federal power developments in the Western states.

In 1941 the private and municipal systems spent $78,800,000. A year ago these systems reported budgets of $78,375,000. Thus actual expenditures closely followed original planning. Federal agencies expended $73,000,000 on power development in 1941.

Programs for 1942 are geared strictly to war time realities. Even so there is doubt expressed that materials will be available for all of the projected work. Much will depend upon priorities or allocations, whichever system is in effect.

Through the generous cooperation of chief engineers and other executives of private and municipal systems, and of officials of government agencies, ELECTRICAL WEST is able to present detailed analyses of 1941 construction activities and 1942 plans in the following pages.

Reports appear alphabetically under each state on the following pages:

Arizona	45	Nevada	54
California	45	New Mexico	54
Colorado	52	Oregon	55
Idaho	53	Utah	58
Montana	54	Washington	58

Federal

Bonneville

ACTIVITIES of the Bonneville Power Power Administration are reported on Page 55. Tables showing lines and substations are on pages 58-59. The Army Corps of Engineers report on the Bonneville power plant is on page 55.

Bureau of Reclamation

CURRENT appropriations and unexpended balances totaling approximately $112,000 are available for carrying forward the construction pro-

gram of the Bureau during the fiscal year ending June 30, 1942. The sources and amounts of these funds are as follows:

Appropriations by Congress from the Reclamation fund	$15,500,000
Appropriations by Congress from the General Treasury	96,000,000
Allotments by PWA	200,000
Allotments by WPA	300,000

The principal work involving electric power for the fiscal year 1942 is briefly described in the pages which follow under the states in which each project is located. A tabulation of power development appears on page 51.—*S. O. Harper, chief engineer.*

Rural Electrification

THERE was no slackening in rural electrification progress in the far West in 1941. The status of REA projects is tabulated on page 46. In the fiscal year ending June 30, 1941 over 20,000 more farms were connected to the lines of private utilities, REA cooperatives and public power districts, bringing the percentage of farms receiving electricity up to 60.8% for the 11 states west of the 100° meridian.

Allotments by REA in the Western states during calendar year 1941 totalled $8,907,700, bringing the total funds allocated from this source up to $37,085,548 Unofficial estimates for 1942 show more than $5,000,000 in applications for loans now on file with REA. These are exclusive of new projects that might develop during the forthcoming year. Actual construction will depend upon Congressional appropriations and on the materials available under the war activities.—*Information Section, REA.*

Arizona

Arizona Edison

THE TOTAL of all electric construction is $162,760 for 1941 and $172,000 is budgeted for 1942. No generating capacity was added in 1941 and none is contemplated for '42 except for minor work. Approximately 27 mi. of transmission line was added in the past year and about 48 mi. of line is scheduled for 1942. Very little re-conductoring or re-insulating work has been or will be done. Ten miles of the new transmission lines will be used for defense work and lighting of airports. Substation capacity in 1941 was increased by 975 kva. and an addition of 3,150 kva. is contemplated for 1942.—*I. P. Hodges.*

Arizona Power

TOTAL capital expenditures for the electric department for the 11 months ending November 30, 1941, were $73,000, and $70,400 has been budgeted for 1942, which consists mainly of distribution system betterments, new business extensions and miscellaneous improvements.

During 1941 the third section of the Verde 44-kv. line was rebuilt and work started on the fourth section completing the rebuilding of the entire 40-mi. line. The company has contracted to sell wholesale power to the municipal system at Williams and it is proposed to build 18 mi. of new 44-kv. line and to overbuild 5 mi. of existing poles with a 44-kv. circuit. At Williams a 450-kva. substation will be constructed.—*Malcolm M. Bridgwater, general superintendent.*

Salt River Valley Assn.

THE ASSOCIATION expended $2,250,000 for new facilities in 1941 and expects to spend approximately $630,000 in 1942. The major 1941 expenditures were for a new steam installation at our Tempe station. Three 9,375-kva. turbo-generator units have just been placed in operation. No other improvements have been made to generating equipment other than maintenance and repair.

We constructed approximately 30 mi. of 69-kv. transmission lines last year and installed 9,000 kva. and 14,000 kva. in frequency changer capacity to permit our 25-cycle system to use 60-cycle Parker Dam power. Increases in distribution were nominal.—*F. L. Roe, superintendent of power.*

Tucson G., E.L. & P.

ADDITIONS to the electric system in 1941 totaled $205,000 and a somewhat larger amount will be expended in 1942 to provide for military establishments in this area. Generating capacity will be provided when a new 115-kv. line from Phoenix is completed in 1942 which will deliver 15,000 kw. of Parker Dam power to our system. During the last year five feeder panels in the Tucson plant were rebuilt when the system was cut over from 2.4 kv. delta to 4.1 kv. star.

During 1942 we will build a 45-kv. transmission line to Fort Huachuca to serve a 3,000-kw. base load. This will involve the rebuilding of 25 mi. of existing line changing from No. 4 to No. 00 copper and the construction of 50 mi. of new line. Total cost will be approximately $225,000.

During 1941 66 mi. of distribution lines were added and five circuits modernized. A total of 1,969 kva. of distribution transformers were added. A modern distribution system costing $58,000 was built for the U. S. Army airport. A new 750-kva. substation was erected to supply this load. Capacitors to the extent of 180 kva. were added. —*M. A. Pooler, president and general manager.*

California

Anaheim Light Dept.

MAJOR PROJECT undertaken during 1941 was the installation of power factor correction apparatus to take care of the greatly increased loads over the last several years and the prospects of even greater increases to come. Banks of standard 15-kva. capacity were used and single-phase capacitor units installed at strategic points in the system. First installation was made in January with succeeding banks installed until the project was finished in May 1941. In all there were 14 banks of capacitors installed, ten of 12 units each and four of six units each, a total of 1,800 kva. in capacitors at 50 cycles. Total cost of the work was approximately $14,000. Providing the load on the system remains at a relatively high figure during the coming months, the project should pay for itself in approximately 24 months through the power factor discount clause allowed by Southern California Edison Co. from whom energy is purchased wholesale—*V. W. Hannum, superintendent.*

Burbank Public Service Dept.

CAPITAL outlay for 1941 was approximately $1,000,000 and similar expenditures planned for 1942 are approximately $900,000.

In October, 1941 the first unit of a new steam-electric generating plant went into operation. This is a 10,000-kv. 3,600-rpm. Allis-Chalmers unit, with two 825°, 625 psi B & W boilers. It has been running at full load ever since placed in operation. Contracts have been let for major items of equipment for a second similar unit, which is scheduled for October 1942, priorities and deliveries permitting. Preliminary engineering for a third unit is now under way.

The two 34.5-kv. transmission lines supplying the city were converted into a loop system to provide greater reliability of service to vital defense plants.

A completely new system of high-speed relay protection also was installed. No further transmission capacity is contemplated.

Three 1,500-kva. and one 2,500-kva. feeder were added to the distribution system in 1941. They are 3-phase, 4-wire, 4.3-kv. feeders each regulated either by a step or induction type regulator. Approximately 2,500 kva. of distribution transformers were added to the system.

A 10,000-kva. substation was completed near one of the aircraft plants. Extremely reliable service is provided by a dual-source primary feed, split-bus operation of transformers and the low capacity factor which will permit either bank to serve the entire factory without serious overloading. A similar substation was installed adjacent to a second aircraft plant. Four industrial substations ranging from 1,500 down to 200 kva. in capacity were installed.

Energy consumption for the fiscal year increased 72% over the preceding year. Since much of the 1942 program is intimately related to national defense projects, little may be said about it except that growth similar to the past two years is anticipated.—*J. H. McCambridge, general superintendent.*

California Electric Power

EXPENDITURES for new and improved facilities in 1941 totaled $1,082,590 and the proposed budget for 1942 calls for $1,072,465. During this year emphasis is being placed on strengthening the transmission and distribution system structure with the principal additions allocated to important distribution load centers.

In 1941 there were no additions to generating equipment. Semi-automatic equipment was installed in one hydro plant and furnace equipment modernized at one steam station. There were no additions to the transmission system. Ninety-seven miles of distribution lines costing $756,570 were added. Substation improvements included 29,915 kva. of new transformer capacity and replacement or modernization of breakers at several locations. We added 216 kva. of bus regulation and replaced or added to lightning arrester facilities. A 55-kv. metering installation was made.

1942 Plans

Considerable maintenance of generating equipment is scheduled, including reinsulation of one generator stator, reconstruction of the rotating field on another and reinstallation of an inactive turbine, generator and appurtenances at another existing station. Transmission expansion includes 64 mi. of new line to serve defense loads and reconstruction of two short sections of 88-kv. line.

Distribution expenditures will total $408,540, principally for reconstruction of existing feeders to provide for increased capacity. About 20 mi. of new line will be built. Some 5,900 kva. of new substation capacity is contemplated and a new 2,000-kva. condenser will be installed. About 216 kva. will be added in feeder regulation and 1,000 kva. in main bus regulation. A new urban substation is planned and several important rural substations will be cut over to 4 kv.

Improvement and modernization of existing communication facilities and other miscellaneous expenditures will total $135,940.—*R. H. Halpenny, electrical engineer.*

Western REA Systems

System	Borrower's Name	Cumulative Allotments‡	1941 Allotment	Consumers (a) Connected
ARIZONA	**State Total**	**$ 953,000**	**$ 40,000**	**925**
2 S. E.*	Stonewall Electric Co., Tucson	100,000	0	123 (c)
4 Pinal*	San Carlos Irrigation & Drainage District, Coolidge	145,000	0	286
14 Cochise*	Sulphur Springs Valley Electric Coop., Inc., Willcox	708,000	40,000	516 (d)
CALIFORNIA	**State Total**	**$2,051,500**	**$ 183,000**	**3,839**
1 Imperial*	Imperial Irrigation Dist., Imperial	700,000	0	1,800
6 Modoc*	Surprise Valley Electrification Corp., Alturas	798,500	94,000	962
16 Plumas*	Plumas-Sierra Rural Electric Coop., Portola	392,000	64,000	661
18 San Diego*	Mountain Empire Electric Coop., Inc., Campo	136,000	0	416 (b)
24 Bard D. P.	Bard Laguna Electric Coop., Inc., Bard	25,000	25,000	0
COLORADO	**State Total**	**$8,133,000**	**$2,641,000**	**9,834**
7 Mesa*	Grand Valley Rural Power Lines, Inc., Grand Junction	430,500	90,000	961
14 Alamosa*	San Luis Valley Rural Electric Coop., Inc., Monte Vista	597,500	210,000	995
15 Morgan*	Morgan County Rural Electric Assn., Fort Morgan	845,000	240,000	844
16 Jefferson*	Intermountain Rural Electric Assn., Littleton	391,000	44,000	333
17 Prowers*	Southeast Colorado Power Assn., La Junta	757,500	30,000	1,447
18 Gunnison	Gunnison County Electric Assn., Inc., Crested Butte	328,000	170,000	0
20 Delta*	Delta-Montrose Rural Power Lines Assn., Delta	588,000	0	1,011
21 S. E.*	Stonewall Electric Co., Trinidad	39,000	0	144
22 Boulder*	Union Rural Electric Assn., Inc., Brighton	405,000	0	849
25 Pueblo*	San Isabel Electric Assn., Inc., Pueblo	119,000	0	282
26 San Miguel*	San Miguel Power Assn., Inc., Nucla	174,000	0	410
29 Phillips*	Highline Electric Assn., Holyoke	1,253,500	802,000	612
31 Larimer*	Poudre Valley Rural Electric Assn., Inc., Severance	591,000	5,000	1,189
32 LaPlata*	LaPlata Electric Assn., Inc., Durango	161,000	0	353
33 Dolores*	Empire Electric Assn., Inc., Dove Creek	338,000	215,000	260
34 Eagle*	Holy Cross Electric Assn., Inc., Basalt	299,000	176,000	144 (d)
35 Chaffee	Sangre De Cristo Electric Assn., Inc., Salida	160,000	160,000	0
36 Routt	Yampa Valley Electric Assn., Inc., Steamboat Springs	175,000	18,000	0
37 Douglas	Mountain View Electric Assn., Inc., Colorado Springs	481,000	481,000	0
IDAHO	**State Total**	**$3,619,750**	**$ 406,000**	**5,531**
4 & 6 Bonner*	Northern Idaho Rural Elec., Rehabilitation Assn., Inc., Sandpoint	762,750	277,000	1,001
10 Nez Perce*	Clearwater Valley Light & Power Assn., Inc., Lewiston	1,392,000	128,000	2,400
11 Kootenai*	Kootenai Rural Electrification Assn., Inc., Coeur d'Alene	284,000	0	578
14 Valley*	Long Valley Power Coop., Donnelly	157,000	38,000	213
15 Idaho*	Idaho County Light & Power Coop. Assn., Inc., Grangeville	339,000	0	495
16 Cassia*	Raft River Rural Electric Coop., Inc., Malta	116,000	0	234
17 Fremont*	Fall River Rural Electric Coop., Inc., Ashton	364,000	130,000	432 (b)
19 Butte*	Lost River Electric Coop., Inc., Arco	109,000	27,000	178 (d)
21 Camas	Prairie Power Coop., Inc., Fairfield	96,000	6,000	0
MONTANA	**State Total**	**$3,678,598**	**$ 371,000**	**6,194**
1 Ravalli*	Ravalli County Electric Coop., Inc., Corvallis	187,800	0	424
2 Cascade*	Sun River Electric Coop., Inc., Fairfield	482,500	0	874
5 Richland*	Lower Yellowstone Rural Electrification Assn., Inc., Sidney	176,600	0	455
9 Yellowstone*	Yellowstone Valley Electric Coop., Inc., Huntley	383,498	7,000	1,116
10 Madison*	Vigilante Electric Coop., Inc., Trout Creek	490,000	220,000	589 (b)
11 Sanders**	Sanders Electric Coop., Inc., Trout Creek	128,000	0	0
12 Missoula*	Missoula Electric Coop., Inc., Missoula	257,000	0	367
13 Flathead*	Flathead Electric Coop., Inc., Kalispell	253,700	10,000	526
15 Fergus*	Fergus Electric Coop., Inc., Lewistown	386,000	0	406
16 Park*	Park Electric Coop., Inc., Livingston	238,000	114,000	241
17 Rosebud*	Mid-Yellowstone Electric Coop., Inc., Hysham	188,500	0	351
19 Stillwater*	Beartooth Electric Coop., Inc., Absarokee	294,000	0	454
21 Big Horn*	Big Horn County Electric Coop., Inc., Lodge Grass	213,000	20,000	391
NEVADA	**State Total**	**$ 254,000**	**$ 27,000**	**400**
3 Alamo D. P.	Alamo Power Dist. No. 3, Alamo	27,000	27,000	0
4 Overton*	Overton Power Dist. No. 5, Overton	227,000	0	400
NEW MEXICO	**State Total**	**$1,449,000**	**$ 504,000**	**1,971**
4 Eddy*	Central Valley Electric Coop., Inc., Artesia	345,000	16,000	455
8 Roosevelt*	Roosevelt County Electric Coop., Inc., Portales	302,000	100,000	564
9 Curry*	Farmers' Electric Coop., Inc., Clovis	264,000	0	633
12 Otero*	Otero County Electric Coop., Inc., Cloudcroft	145,000	—5,000	319
13 Stonewall Electric	Stonewall Electric Co., Albuquerque	216,000	216,000	0
14 Mora	Mora-San Miguel Electric Coop., Inc., Mora	177,000	177,000	0
OREGON	**State Total**	**$4,674,500**	**$1,451,000**	**4,190**
2 Lane*	Blachly-Lane County Coop. Assn., Blachly	282,000	143,000	305
4 Lincoln*	Benton-Lincoln Electric Coop. Assn., Corvallis	1,040,000	465,000	677 (b)
5 Clatsop*	Nehalem Valley Coop. Electric Assn., Jewell	99,000	10,000	332
14 Umatilla*	Umatilla Electric Coop. Assn., Hermiston	278,000	15,000	742
16 Malheur*	Malheur Coop. Electric Assn., Vale	272,000	32,000	371
17 Douglas*	West Douglas Electric Coop., Inc., Roseburg	132,000	0	340
18 Eugene	Lane County Electric Coop., Inc., Eugene	650,000	0	0
19 Jordan Valley*	Jordan Valley Electric Coop., Inc., Jordan Valley	30,000	0	89

Central Valley Project, USBR

ON THE KENNETT Division construction of the Shasta Dam and power plant will continue throughout the fiscal year. Relocation of the Southern Pacific Railroad and construction of Pit River Bridge will be completed, and routing of traffic over the relocated railroad is expected to begin about

System	Borrower's Name	Cumulative Allotments‡	1941 Allotment	Consumers (a) Connected
21 Coos*	Coos Electric Coop., Inc., Coquille	460,500	224,000	370
22 Clackamas	Northeast Clackamas County Electric Coop., Inc., Sandy	71,000	0	0
25 Deschutes*	Central Electric Coop., Inc., Redmond	327,000	77,000	474
26 Wasco*	Wasco Electric Coop., Inc., The Dalles	345,000	105,000	345 (d)
28 Oakland*	North Douglas Electric Coop., Inc., Roseburg	688,000	380,000	145
UTAH	**State Total**	**$1,312,000**	**$ 423,000**	**1,724**
6 Garfield*	Garkane Power Assn., Inc., Hatch	589,000	357,000	613
7 P. L. & P.*	Peoples Light & Power Co., Loa	5,000	0	38 (c)
8 Duchesne*	Moon Lake Electric Assn., Inc., Mt. Emmons	708,000	56,000	1,073
9 Beaver	Beaver Valley Electric Assn., Inc., Beaver City, Utah	10,000	10,000	0
WASHINGTON	**State Total**	**$7,584,700**	**$1,466,000**	**8,839**
8 Benton*	Benton Rural Electric Assn., Prosser	346,500	0	879
9 San Juan*	Orcas Power & Light Co., Eastsound	476,000	0	254
14 King*	Mutual Power & Light Assn. of Tanner, North Bend.	22,200	0	35 (b)
17 Klickitat*	Public Utility Dist. No. 1 of Klickitat County, Goldendale	550,000	450,000	155
18 Spokane*	Inland Empire Rural Electrification, Inc., Spokane	2,030,000	—100,000	2,863
20 Columbia*	Columbia County Rural Electric Assn., Inc., Dayton	309,000	64,000	239
23 Grays Harbor*	Quinault Light Co., Quinault	79,000	0	150
25 Cowlitz*	Public Utility Dist. No. 1 of Cowlitz County, Longview	221,000	10,000	502
27 Lewis*	Public Utility Dist. No. 1, Chehalis	416,500	0	1,213
28 Kittitas*	Public Utility Dist. No. 1 of Kittitas County, Ellensburg	151,000	0	323
29 Skamania	Public Utility Dist. No. 1 of Skamania County, Stevenson	0	—28,000	0
30 Stevens*	Stevens County Electric Coop., Inc., Colville	596,000	0	545
31 Chelan	Chelan County Electric Coop., Inc., Leavenworth	62,000	62,000	0
32 Okanogan*	Okanogan County Electric Coop., Inc., Winthrop	168,500	14,000	306
33 Mason	Public Utility Dist. No. 3 of Mason County, Shelton	0	—51,000	0
35 Pend Oreille*	Pend Oreille Electric Coop., Inc., Newport	334,000	115,000	406
36 Adams*	Big Bend Electric Coop., Inc., Ritzville	432,000	170,000	256
37 Lincoln*	Lincoln Electric Coop., Inc., Davenport	608,000	160,000	554
38 Douglas	Douglas County Electric Coop., Inc., Waterville	75,000	0	0
39 Nespelem*	Nespelem Valley Electric Coop., Inc., Nespelem	108,000	0	159
45 Grant	Public Utility Dist. No. 2 of Grant County, Ephrata	600,000	600,000	0
WYOMING	**State Total**	**$3,375,500**	**$1,195,700**	**3,809**
3 Fremont*	Riverton Valley Electric Assn., Inc., Riverton	261,000	10,000	461
5 Big Horn*	Big Horn Rural Electric Co., Basin	411,000	0	743
6 Goshen*	Wyrulec Co., Lingle	243,000	0	463
9 Uinta*	Bridger Valley Electric Assn., Inc., Mountain View	181,000	39,000	275
10 Platte*	Wheatland Rural Electric Assn., Wheatland	80,000	* 0	191
11 Lincoln	Lower Valley Power and Light, Inc., Freedom	454,000	10,000	705
12 Park*	Garland Light and Power Co., Powell	199,300	127,000	184
13 Washakie*	Washakie Rural Electric Co., Worland	56,500	0	150
14 Laramie*	Rural Electric Co., Pine Bluffs	1,009,000	603,000	513
16 Hot Springs	Hot Springs County Rural Elec. Assn., Thermopolis	88,000	88,000	0
17 S. E.*	Stonewall Electric Co., Sheridan	78,700	4,700	124 (d)
21 Carbon	Carbon Power and Light Co., Saratoga	314,000	314,000	0

* Energized in part or in whole as of October 31, 1941.
** Consolidated with Idaho 4 & 6—August 14, 1941.
‡ Data shown are net; include allotments and rescissions through December 31, 1941.
(a) October 31, 1941 except as noted.
(b) September 30, 1941.
(c) June 30, 1941.
(d) Estimated.

REA Generating Plants

System	Location of Plant	Kw. Capacity	Type	Status
Arizona 14 Cochise	Near McNeal, Cochise County	1425	Nat. Gas Diesel	Operating
California 6 Modoc	Near Alturas, Modoc County	772	Diesel	Operating
Colorado 18 Gunnison	Crested Butte, Gunnison County	500	Hydro	Under Const.
Colorado 33 Dolores		100	Mobile Diesel	Operating
Idaho 4 Bonner	Outlet of Priest Lake, Bonner Co.	1000	Hydro	Under Const.
Idaho 14 Valley		200	Mobile Diesel	Operating
New Mexico 12 Otero		220	Mobile Diesel	Operating
Oregon 2 Lane	Blachly, Lane County	150	Hydro	Operating
Oregon 16 Malheur		220	Mobile Diesel	Operating
Oregon 19 Jordan Valley		100	Mobile Diesel	Operating
Utah 6 Garfield	Hatch, Garfield County	200	Diesel	Operating
Utah 6 Garfield	Hatch, Garfield County	500	Hydro	Allotted
Utah 8 Duchesne	Near Mt. Emmons, Duchesne County	600	Hydro	Operating
Utah 8 Duchesne	Near Mt. Emmons, Duchesne County	300	Hydro	Under Const.
Washington 9 San Juan	San Juan, Orcas Island, S. J. County	250	Diesel	Operating
Washington 23 Gray's Harbor	Quinault, Gray's Harbor County	250	Hydro	Operating
Wyoming 9 Uinta	Lymar, Uinta County	224	Nat. Gas Diesel	Operating
Wyoming 11 Lincoln	Near Freedom, Lincoln County	600	Hydro	Operating

* As of Dec. 31, 1941.

April 1, 1942. Relocation of highways, public utilities and Forest Service facilities will be completed. Two existing contracts for clearing a portion of the Shasta Reservoir area will be completed and two other contracts were awarded last fall under which work will continue throughout the fiscal year. Construction of works for the care of migratory fish will be continued.

A contract has been awarded for the first stage construction of the Keswick Dam, work under which began last fall and will continue throughout the fiscal year. Contract for the second stage will be let some time in the fiscal year 1942. This is a power project and work will be rushed to permit delivery of power at the earliest date possible, and it is hoped to have the Keswick power plant in operation by the fall of 1943.

Coast Counties G. & E.

EXPENDITURES for new and improved facilities in 1941 were $237,000. Our forecast for 1942 indicates that approximately the same amount will be spent. During 1941 we converted 20 mi. of 22-kv. line between Santa Cruz and Watsonville to 60-kv. operation, it having been built with that idea in mind. About 10 mi. of 60-kv. line will be built near Santa Cruz in 1942. Twenty-two and one-half miles of distribution lines were added during the last year; also one large industrial customer with a peak load of about 2,500 kva. We expect that difficulty in obtaining materials, both for the building of home and commercial structures, will indirectly curtail new business extensions during 1942. Substation capacity was increased by 5,750 kva. and considerable protective equipment added to forestall possible sabotage.

Last year frequency-modulated radio equipment was added in some towns for emergency dispatching, and further extension of this is contemplated for 1842. This type of equipment has many advantages in facilitating communication and in saving time in dispatching. Present conditions make it impossible to estimate accurately just what conditions will be in 1942. Blackouts, movement of workers from nondefense industry to defense work, with possible subsequent shift in population—all these present an uncertain picture of the future—*A. E. Strong, general superintendent.*

Glendale PS Dept.

THE FIRST UNIT of the city's new steam plant was completed in April and expenditures for the past budget year approximated $1,025,000. The second unit is on order but with uncertainties of deliveries, expenditures at this time cannot be determined.

The new plant supplies peak capacity requirements in excess of Boulder transmission line capacity, estimated at 17,800 kw., and provides 100% standby in case of failure of the Boulder line. Initial installation consists of one 20,000-kw. 80% power factor turbo-generator and two 200,000-lb. boilers operating at 650 lb. presure and 825° temperature.

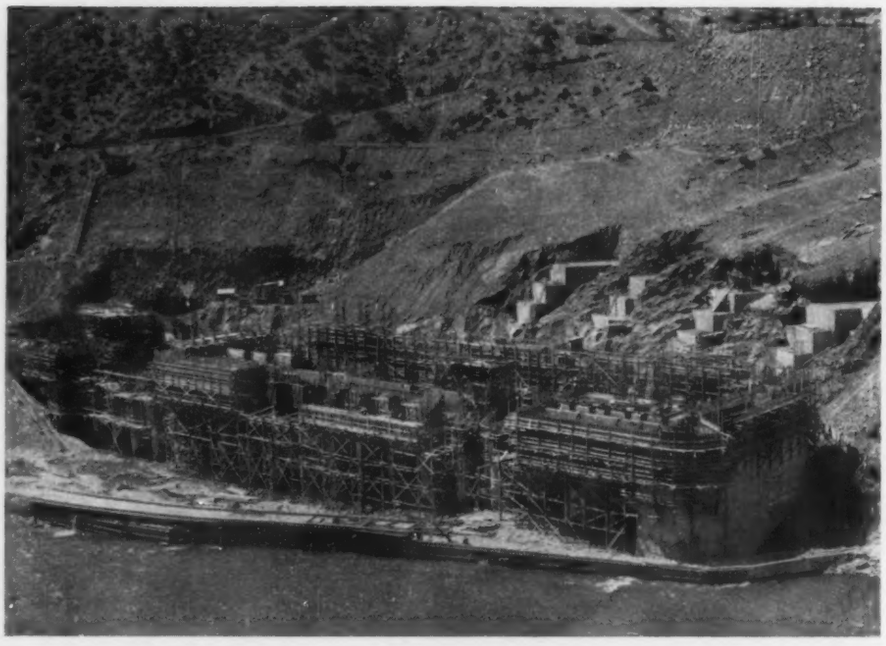
Several of the 4-kv. primary distribution feeders reached an overloaded condition during last winter and it was deemed necessary to split them and reduce the area served. As a result six new feeders were placed in service. Substation transformer capacity was adequate but new induction regulators, oil circuit breakers and reactors for feeder positions were installed along with new overhead feeders from the substations to the load centers as well as underground cable in the vicinity of the substations.—*P. Diederich, superintendent of public service.*

Imperial Irrigation District

HYDRO PLANTS Nos. 3 and 4 on the All-American Canal were placed in operation in February and March, 1941, with a total capacity of 14,400 kw. Approximately 40 mi. of distribution lines were constructed, mostly short extensions serving new loads, and several small street lighting installations were made.

The capacity of Imperial substation was increased from 750 to 1,500 kw. and a 300-kva. rural substation was added to the Seeley switching substation.

No generating or transmission line capacity additions are planned for 1942, all construction probably being limited to maintenance since there are no large defense loads in this area. The only major construction item definitely planned is the installation of the terminal equipment at Drop No. 4 Hydro Plant for the transmission line under construction by the USBR which will deliver Parker Dam power to this system.—*M. J. Dowd, chief engineer and general superintendent.*



Last winter floods prevented work on Shasta Dam power plant for many weeks. This winter construction is above the high water level and steel plate liners for the draft tubes are being installed preparatory to beginning installation of turbines. Two of the five 75,000-kw. generators have been shipped and are being stored

Los Angeles Bureau of P & L

CONSTRUCTION expenditures for new and improved facilities during 1941 amounted to approximately $9,300,000. The 1942 program calls for the expenditure of approximately $15,400,000, which is a material curtailment of the previous expansion program.

Generation facilities were increased in October, 1941 by the release to the city of one 82,500-kw. generating unit at Boulder power plant. This makes six units now operated on the city system at this location, including the unit now under lease from the Metropolitan Water District. It is anticipated that an additional 82,500-kw. unit, which has been under construction during the past year, will be made available to the city some time in the early summer of 1942, at which time the above mentioned leased unit will be returned to the district.

Construction at Harbor steam plant progressed rapidly during the last half of 1941, with the first unit of 65,000 kw. scheduled to be available for service in November, 1942, and a similar unit in November, 1943. Substructures have been, for the most part, completed and the superstructure for boiler facilities is approaching completion.

No additions were made to major transmission systems during the past year. An additional section of the 132-kv. belt line extending from Receiving Station E in San Fernando Valley to Receiving Station D, now under construction in West Los Angeles, was started and material progress made on its construction. 5. mi. of this line will be of 132-kv., two-circuit, oil-filled underground cable. The remaining portion of the line was designed as double circuit, overhead vertical steel tower construction. The entire cost of this section of belt line is estimtaed as $2,175,000.

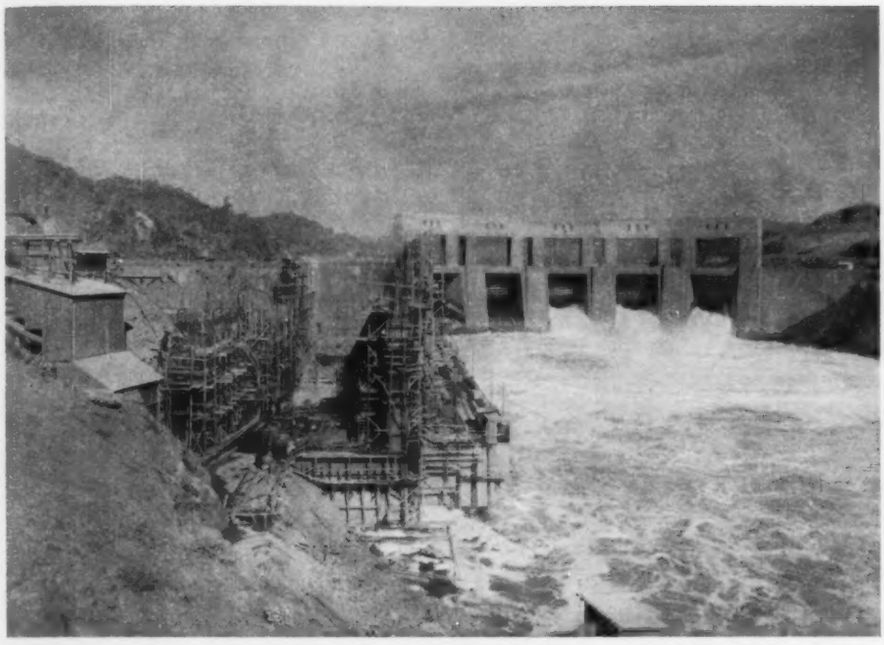
Construction of Receiving Station D has progressed materially and much of the equipment has already been delivered and is now in process of installation. The expenditure for this station at the present time is estimated as $2,162,000. These facilities will be available for the system peak demands of 1942. In addition to improving voltage regulation in the southwest portion of the city, which it will ultimately serve, this station will introduce improved efficiencies in system operation due to the shortening of sub-transmission circuits. Only one major distributing station was added during the past year but the total capacity of distributing stations was increased by 26,975 kva. Capacity additions at industrial and commercial stations, which are terms used by the Bureau of Power and Light for major stations located on consumers' premises, amounted to 36,719 kva.

Distribution system improvements during the past year included: Overhead—addition of 105 circuit miles of primary and secondary distribution and 14 circuit miles of 34.5-kv. lines. Underground—2.86 mi. of 34.5-kv. cable and 118 cable miles of primary and secondary, including services. Transformer capacity connected to the 4.8-kv. distribution system was increased 32,630 kva. and 16 regulated feeders were installed in overhead and underground systems. The net increase in meters was 17,423 accompanied by an increase in connected load of approximately 130,000 kw.

Other electric system additions included backup relay protection on the Boulder transmission system and installation of Pyranol and Inerteen filled feeder regulators in whole, or in part, of four major distributing stations, installation of cathodic protection on the underground piping system at Receiving Station C, as well as numerous system improvements and protective measures as a part of the present national defense program.

A considerable portion of the 1942 program will be represented by the completion of the first 65,000-kw. unit at Harbor steam plant and the progressing of a second unit of like size, together with the completion of Receiving Station D and connecting belt line system.

Additions to transmission facilities will include approximately 2 mi. of 132-kv. underground cable connecting the Harbor steam plant with Receiving Station C, and approximately 5 mi. of 132-kv. overhead line from Receiving Station C to the aluminum reduction plant now under construction between Los Angeles and the harbor district.—*H. C. Gardett, chief engineer and general manager.*



At Parker Dam on the lower Colorado River work is being rushed on the power house so that the first three of the four 45,000-kw. units will be ready for operation by November, 1942. Power from Parker Dam will be required to supplement Boulder Dam energy for the 200,000-kw. Basic Magnesium Co. plant near Las Vegas

Pacific Gas and Electric

ADDITIONS and betterments to electrical facilities during 1941 required the expenditure of $25,000,000. The sum budgeted for corresponding activities during 1942 is $39,600,000. The exceptionally large expansion in the construction program indicated for 1942 has been dictated chiefly by a rapid growth in industrial load arising from national defense needs.

1941 Program

PRODUCTION—A total of 50,000 kva. of generating capacity was added to the system during the year by the completion in July of Martinez steam plant. The initial 50,000-kva. unit at Oleum was substantially complete and undergoing operating tests in December preparatory to placing it in service early in 1942. Both of these plants have been described fully in previous issues of ELECTRICAL WEST. In March the construction of a second 50,000-kva. turbogenerator and three additional boilers at Oleum was commenced. Completion is programmed for July 1943.

Hydroelectric generating facilities under construction during 1941 included the Dutch Flat plant, described in our report of 1940 activities, the Narrows power house situated below Upper Narrows Dam on the Yuba River near Smartsville, and the proposed Pit River No. 5 plant about six miles below the town of Big Bend on Pit River.

The 5-mi. Dutch Flat tunnel was holed through in December, and the erection of the penstock and construction of the power house are under way with completion scheduled for August 1942.

Narrows plant will make use of the 230 ft. of head created by the recently completed United States government debris dam at Upper Narrows. This unit will consist of a 13,500-hp. vertical Francis type turbine direct connected to an 11,000-kva. generator. The plant is scheduled for completion in December 1942.

Pit No. 5 project will include a low diversion dam about eight miles below Pit No. 4 dam, a 6-mi., 19-ft. diameter, lined pressure tunnel and four penstock lines approximately 1,300 ft. long, each supplying a 50,000-hp. vertical turbine direct connected to a 40,000-kva. generator. The plant will be capable of generating 146,000 kw. on peak. Construction of the tunnel was commenced in July 1941. Present plans call for completion of the plant in August 1943.

TRANSMISSION — Improvements comprised, principally, extensions of and ties to existing circuits necessary to supply the industrial loads of defense industries, and the construction of lines required to deliver blocks of energy from the newly completed or projected generating plants to load centers. A 110-kv. single circuit on towers from Oleum steam plant to Golden Gate substation in Richmond was completed and a 110-kv. twin-circuit tie between Oleum and Claremont Junction was under construction during 1941. Other completed 110-kv. construction included a twin-circuit tap line from the existing Martinez-Contra Costa circuits to Dow Chemical substation east of Pittsburg, and a tap from the Big Bend-Brighton 110-kv. lines to East Nicolaus substation.

In November construction of a 110-kv. twin circuit tower line from Newark to Magnesium substation was commenced to supply upwards of 100,000 kva. of energy to the Permanente Metals Corp. A new 60-kv. circuit was added from Newark to Decoto to reinforce the supply to Pacific States Steel Co. and a new line was constructed from the East Nicolaus substation to Tudor. In conjunction with the latter, existing conductors on other lines in this locality were increased in size, thus improving the 60-kv. supply to Marysville, Colusa, Gridley and other towns in the vicinity. Additional 60-kv. construction included a re-routing of the Standard lines around Moffett Field and a loop of the Redding-Cottonwood line into Shasta substation to support the 60-kv. supply for Shasta Dam. In all some 75 circuit miles of transmission, 60-kv. and up, have been added to the Pacific system during 1941.

Supplementing the foregoing line construction, transmission improvements included necessary new facilities at several high voltage substations. To reinforce the 60-kv. system in various critical points additions and changes were made to Shasta, Newark, San Mateo and Soledad substations and a new station at East Nicolaus had been substantially completed at the close of the year. A 100-kv. step-down station was installed to supply the Ames Aeronautical Laboratory near Sunnyvale and miscellaneous improvements were made at Brighton substation near Sacramento to increase the 100-kv. power supply from this point.

DISTRIBUTION—The normal growth of the distribution system in 1941 was affected materially by the large number of installations made for supplying power to defense industries. Some 750 miles of distribution were added in the course of the year's operations. Many installations of static capacitors were made on the distribution system to increase its capacity by reducing the wattless component and also to improve the voltage and relieve overload. Under the prevailing war conditions with their attendant shortages in materials and skilled factory labor the desirability of procuring such increases of system capacity without the use of other apparatus is obvious.

In certain areas where the load fed from the existing substations had increased to such an extent as to overload the present installed capacity, the installation of zone substations of approximately 2,000-kva. capacity gave

the required relief. This obviated the necessity of making additions to the existing substations and at the same time met the voltage regulation problem in a most economical manner.

The extension of the low voltage secondary network system in certain of the more congested communities was continued during 1941.

The standardization of EEI and NE MA methods of hanging transformers and the adoption of a standard hanger for all manufacturers' transformers is requiring some change in distribution practice. During 1941 some 38,000 new meters were set throughout the system.

Program for 1942

PRODUCTION—A continuation of hydro-electric construction inaugurated in 1941 will bring to completion in 1942 both the Dutch Flat and Narrows projects with a combined installed capacity of 38,500 kva. Including Oleum No. 1 unit, expected to be in full production by March, total additions for the year will amount to 88,500 kva. which will provide adequately for anticipated growth in defense load and normal system requirements. Work on the second unit at Oleum will continue and is scheduled for completion in July 1943. It is planned to prosecute construction of Pit River No. 5 project as vigorously as conditions permit with a view towards having its 160,000 kva. available for use not later than August 1943.

Supplementing these two projects, plans are now well under way for an addition to the company's existing steam-electric generating station at Midway near Buttonwillow, scheduled for completion in August 1944. This plant will consist of two boilers rated at 450,000 lb. per hour designed for 1,500-lb. pressure at 915 deg. F. supplying steam to a 75,000-kva. turbo generator.

In summary, since December 1940 the company has brought in 150,000 kva. of installed capacity at the three steam plants at Avon, Martinez and Oleum. During 1942 and 1943, in addition to increasing the effective capacity at some of its existing plants by 38,000 kw. through the removal of certain restrictions, the company is bringing in 248,500 kva. on its own system, and through an agreement entered into about two years ago has contracted to purchase from Southern California Edison an additional 75,000 kva. of capacity during 1942, 1943 and 1944.

TRANSMISSION—To deliver to the Pacific system the energy to become available from Oleum No. 1, Dutch Flat and Narrows plants will require the completion during 1942 of substantial additions to the transmission system. Such additions include a twin-circuit 110-kv. transmission between Oleum and Claremont Junction, a single-circuit 110-kv. line between Oleum and Martinez, a similar line from Dutch Flat power house to Vaca-Dixon substation and a 60-kv. wood pole line from Narrows power house to Smartsville.

Other 110-kv. transmission lines to be completed are the Newark-Magnesium line already under way, and approximately 60 mi. of single circuit transmission from Midway steam plant to San Luis Obispo; also, a short feeder from North Tower substation at Carquinez Straits to Mare Island to supply standby service to the Navy Yard. Some 30 or more miles of both 110-kv. and 60-kv. lines will be rerouted around Shasta Reservoir.

Various substation additions will be required to handle the supply of energy from the new generating plants. Those planned for construction during 1942 include extensions to the 100-kv. bus and additional circuit breakers at Vaca-Dixon substation to receive the energy from Dutch Flat power house, and additions to Golden Gate substation in Richmond necessary to feed additional power into the 11-kv. system in this vicinity.

DISTRIBUTION—Improvements for the year 1942 are expected to follow much along the lines of 1941 with chief emphasis on problems arising out of defense activity. The usual expansion to provide for normal system growth is not expected because of limitations on materials and the transfer of activity from normal pursuits to the war effort.

With the recent and sudden change in the war situation, it is perhaps too early to attempt to appraise the numerous problems with which the electric utilities will be confronted during 1942. The upward trend in energy output is expected to continue with an accelerated demand for industrial power, although this may likely be offset in some degree by a curtailment of growth in the commercial and domestic fields. In any event, the utilities of California have a thorough appreciation of their responsibilities in the present situation and, if given reasonable freedom of action, are prepared to provide adequately for all foreseeable contingencies.—*W. G. B. Euler, chief engineer.*

Palo Alto

ACTUAL expenditures for improved facilities in 1941 amounted to $22,500. This sum included additions to the street lighting system, new poles and fixtures, transformers and meters. The major expenditure was $5,500 for overhead conductors.

A total of $28,400 has been budgeted for 1942 improvements but actual work is problematical due to the war emergency. However, the city hopes to make pole and fixture additions costing about $7,400 with an additional $6,000 for overhead conductors. Continuation of the 1941 street lighting program is planned with an estimated expenditure of $3,000.—*A. V. Youens, electrical engineer.*

Parker Dam, USBR

THE POWERHOUSE building and switchyards should be completed during the fiscal year. The first three units should be installed and in operation by November 1942. Turbine, generator and other equipment for the fourth unit have been ordered for delivery. The Phoenix terminal substation is scheduled for completion during the fiscal year and construction of the Gila, Tucson, Coolidge and Drop No. 4 substations has begun and should be 90% completed, all by government forces. Contracts have been awarded for construction of the Phoenix-Tucson and Blaisdell-Drop No. 4 transmission lines. These lines should be completed by the end of the fiscal year. The 1942 appropriation is $8,890,000.

Riverside Electric Dept.

DURING the calendar year 1941, distribution lines were extended a distance of 2.16 mi. with an authorized expenditure of rebuilding amounting to $30,046.84. Since all power is purchased from Southern California Edison Co. and California Electric Power Co. and is transmitted over their own lines, this district has no generating equipment nor transmission lines. Substation capacity was added to by 681 kva. and capacitors for power factor correction have been ordered and are expected to be installed during 1942. Riverside's distribution system is operated at almost unity power factor.

During 1941 the city purchased and distributed 34,177,000 kwh. at a yearly distribution loss of 6%.—*R. L. Boulden, superintendent.*

Pasadena Municipal L & P

OUR FISCAL YEAR begins on July 1 and, as a result, we have been operating on our present budget for a trifle over half of the budget year. Construction items which were anticipated one year ago have been partially built or cancelled. The present conditions which require an OPM permit have practically stopped all construction and are causing us delay in proceeding with projects which we have found necessary to initiate due to the emergency conditions. At the present time, we are applying for a project order to erect a new cooling tower to bring our cooling capacity up to the full generating capacity of our plant but until this

permit is secured we cannot proceed with the construction. It is anticipated that a double flow tower will cost us somewhere between $50,000 and $60,000 if the permit is granted. However, the proposal may be turned down by the OPM if it is determined that we are not in a defense area although we are operating a utility which is tied in with other defense area electric generating plants. All other construction has been more or less held up and we cannot make any estimates of what may be approved for our 1942-43 budget.

We are very sorry we cannot give you any more definite information; however we are of the opinion that almost every central station and distributing system will be affected in the same manner, especially if it is not in a defense area. —*B. F. DeLanty, general manager.*

tion, to be known as Silver Gate, located on San Diego harbor at the foot of Sampson Street. The first unit, a 35,000-kw., 3,600-rpm machine, is scheduled to go into operation September 15, 1942. The steam pressure of the new plant will be 850 psi. Construction work on the power plant is progressing rapidly.

In order to provide for interconnections between the Silver Gate Station, Station B, and the Mission Substation, terminus of the 37,000-kw. interconnection with the Southern California Edison Co., completed late in 1940, six miles of new 66-kv. lines are being constructed from Station F to Sampson Substation, a 50,000-kva. substation located near the Silver Gate plant; and from Mission Substation to a new 25,000-kva. substation in Old Town, not far from

1941 Program

GENERATION—No additional generating capacity was made available on the system in 1941, although work on the third generator for Edison use at the Boulder power plant is progressing and the unit is expected to be in service early in 1942. Considerable work has been done at Big Creek on water wheels, both impulse and reaction, so as to give the maximum efficiency when operating at 60 cycles as well as at 50 cycles.

TRANSMISSION—The second 220-kv. transmission line from Boulder to Chino was placed in service Nov. 15, 1941. This, together with an extension from Barre to Lighthipe substation which went into service Aug. 10, totals approximately 250 mi. of 220-kv. lines placed in service in 1941. A new 220-kv. line from Chino to Laguna Bell, approximately 34 mi. long, is under construction and will be completed in March 1942. These additions will complete the work started in 1940 and will provide two 220-kv. circuits from Boulder direct into the 220-kv. system. This second circuit together with the cross-over between Boulder and Chino, will reduce the rolling reserve necessary, improve service reliability and decrease the line losses, as well as practically doubling the transmission capacity from Boulder.

DISTRIBUTION—Approximately 160 miles of distribution lines were constructed during 1941. This is not large as compared with past years due to the fact that most of the company's new business is being connected to existing lines. Line extensions are primarily to industrial defense installations and defense housing projects.

MISCELLANEOUS—During the year the Chino frequency changer was placed in service, providing 50,000 kw. at 60 cycles. A large part of this capacity is used to supply energy to the San Diego Gas & Electric Co. Interconnection capacity of 100,000 kw. between the Edison 220-kv. system and the Pacific Gas and Electric 115-kv. system was

Current and Future Power Development on Bureau of Reclamation Projects

Name of Project	State	River	Purpose(1)	Name of Plant	Year Initial Operation	Initial Capacity Kw.	Initial Capacity No. of Units	Ultimate Capacity Kw.	Ultimate Capacity No. of Units
Boise	Idaho	So. Fork Boise	F.C., Irr., P.	Anderson Ranch	1946	30,000	2	30,000	2
Boulder Canyon	Ariz.-Nevada	Colorado	F.C., Irr., P.	Boulder	1936	(2)787,300	12(3)	1,322,300	19(4)
Central Valley	California	Sacramento	F.C., Irr., P.	Shasta	1943	304,000	4(5)	379,000	5(6)
Central Valley	California	Sacramento	F.C., Irr., P	Keswick	1943	75,000	3(7)	75,000	3(7)
Colorado-Big Thompson	Colorado	Blue	Irr., P.	Green Mountain	1943	21,600	2(8)	21,600	2(8)
Colorado-Big Thompson	Colorado	Big Thompson	Irr., P.	1, 1A, 2, 3, 4, and 4A	(9)	(9)	(9)	160,000	(9)
Columbia Basin	Washington	Columbia	F.C., Irr., P.	Grand Coulee	1941	128,000	2(10)	1,974,300	21(11)
Davis Dam	Ariz.-Nevada	Colorado	F.C., Irr., P.	Davis	1945	180,000	4(12)	225,000	5(13)
Minidoka	Idaho	Snake	Irr., P.	Minidoka	1909	8,400	6(14)	13,400	7(15)
Parker Dam	Ariz.-Calif.	Colorado	Irr., P.	Parker	1942	120,000	4(16)	120,000	4(16)
Rio Grande	New Mexico	Rio Grande	F.C., Irr., P.	Elephant Butte	1940	24,000	3(17)	24,300	3(17)

(1) F.C. = Flood Control; Irr. = Irrigation; P. = Power
(2) As of January 1, 1942.
(3) 9 — 82,500 kw.; 1 — 40,000 kw.; 2 — 2,400 kw.
(4) 15 — 82,500 kw.; 2 — 40,000 kw.; 2 — 2,400 kw.
(5) 4 — 75,000 kw.; 2 — 2,000 kw.
(6) 5 — 75,000 kw.; 2 — 2,000 kw.
(7) 3 — 25,000 kw.
(8) 2 — 10,800 kw.
(9) 6 plants installed in approximately 1944-65.
(10) 1 — 108,000 kw.; 2 — 10,000 kw.
(11) 18 — 108,000 kw.; 3 — 10,000 kw.
(12) 4 — 45,000 kw.
(13) 5 — 45,000 kw.
(14) 5 — 1,200 kw.; 1 — 2,400 kw.
(15) 5 — 1,200 kw.; 1 — 2,400 kw.; 1 — 5,000 kw.
(16) 4 — 30,000 kw.
(17) 3 — 8,100 kw.

San Diego Gas & Electric

DURING 1941 all of the company's efforts were engaged in keeping pace with the rapidly expanding military, naval and defense activities in the territory served. As an indication of the growth involved, it may be noted that governmental housing projects, including 5,775 single family units, and accommodations for 1,588 single men, were undertaken, in addition to which approximately 6,000 homes were constructed by private capital. Building permits in San Diego for the year exceeded $50,000,000. The company's peak load increased from 89,700 kw. in December 1940, to 109,500 kw. in December 1941.

To provide for this growth of business there were installed at the company's steam generating Station B, a new house turbine having a capacity of 3,000 kw., and a new boiler with a capacity of 200,000 lb. of steam per hour. The latter brought the boiler capacity of the station up to that of the generator capacity, which now totals 102,000 kw.

Early in 1941 construction was begun on a new steam-electric generating station, to be known as Silver Gate, located on San Diego harbor at the foot of Sampson Street. The first unit, a 35,000-kw., 3,600-rpm machine, is scheduled to go into operation September 15, 1942. The steam pressure of the new plant will be 850 psi. Construction work on the power plant is progressing rapidly.

In order to provide for interconnections between the Silver Gate Station, Station B, and the Mission Substation, terminus of the 37,000-kw. interconnection with the Southern California Edison Co., completed late in 1940, six miles of new 66-kv. lines are being constructed from Station F to Sampson Substation, a 50,000-kva. substation located near the Silver Gate plant; and from Mission Substation to a new 25,000-kva. substation in Old Town, not far from the new Consolidated Aircraft Corp. parts plant. In addition, the company's 12-kv. network in the City of San Diego was almost completely rebuilt during the past year to take care of the added loads. Harbor Substation, a new 3,750-kw. installation at Kettner and Broadway, was built; together with many smaller substations to serve military units and housing projects.

During the year 88 miles of distribution lines were added to the system.

The initial budget for 1941, including prospective carry-overs into 1942, was $6,073,000. This was increased during the year to $8,825,000, of which $4,800,000 was actually expended in 1941, the balance being carried over into 1942. The total budget for 1942, including carry-overs from 1941, will be $7,000,000.

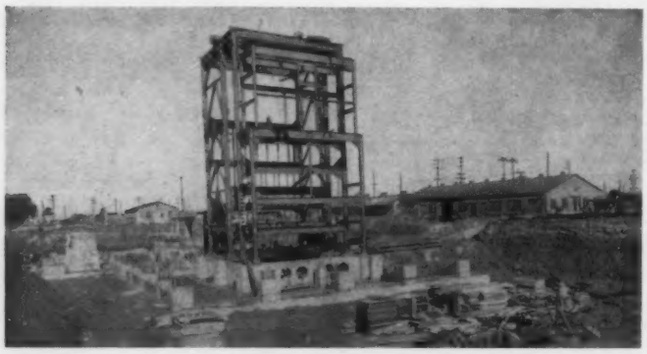
Southern California Edison Co.

EDISON had a busy year in 1941 and we spent approximately $8,500,000 for new and improved facilities. The construction budget for 1942 is approximately $7,000,000.

made available at Piedra Substation in July. In addition to the above approximately 40,000 kva. in substation transformer capacity was added during the year, mostly in and adjacent to the southern California industrial area.

Plans for 1942

In 1942 it is planned to add transformer capacity of 75,000 kva, 220/66 kv., at Chino and similar capacity at Eagle Rock. Also planned is approximately 150,000 kva. in transformer capacity stepping down from 66 kv. to utilization voltage at Edison substations and for defense industrial customers. In addition there will be required 25,000 kva. of distribution substation capacity transforming from 16 or 11 kv. to 4 kv. Practically all of this latter is to provide for defense housing projects or small industrial installations having a defense tie-in.—*N. B. Hinson, chief engineer.*



Construction of Los Angeles Bureau of Power & Light Harbor steam plant has reached the stage pictured above preparatory to operating one 65,000-kw. turbo-generator by Nov.

Los Angeles Bureau's Receiving Station D shown below will be completed before the 1942 peak demands. It will improve system efficiency by shortening sub-transmission circuits

Turlock Irrigation District

AN ESTIMATED $100,000 has been spent during 1941 and the 1942 expenditures are expected to reach about $53,000.

Although no new generating capacity was added during 1941, 15 mi. of 70-kv. transmission line of 6,000-kva. capacity were constructed to serve dredger loads in outlying territory; and 13 mi. of 11-kv. distribution line were added. Included in 1941 improvements was the installation of a step type regulator of 100-amp. capacity—*L. H. Parker, electrical engineer.*

Colorado

Colorado-Big Thompson, USBR

CONSTRUCTION of the Green Mountain Dam and power plant and the Continental Divide tunnel will be continued throughout the fiscal year. At the end of the year, the former should be 70% completed. Work will be continued on the excavation of the Continental Divide tunnel, from both ends throughout the fiscal year, under existing contracts. The two existing contracts cover tunnel excavation and concrete lining of the invert. It is estimated that at the end of the fiscal year 6.5 miles, or 50%, of the tunnel will have been excavated. Bids for construction of Granby Dam were opened in September but were rejected as too high and the work readvertised. Contract for the diversion tunnel has been awarded, permitting work to start this fall and continue throughout the remainder of the fiscal year. Other work will include construction of a short transmission line to the Granby Dam site, purchase of right of way for Shadow Mountain Dam and Shadow Mountain Lake, location surveys for power canals, and other miscellaneous work.

Colorado Springs

OUR 1941 construction program, which consisted mainly of the addition of a new boiler, was not completed on account of a later delivery date than was anticipated. We hope to complete this work in 1942 and also add a new 5,000-kw. steam generating unit, which, together with normal additions to the distribution system, calls for a budget of about $400,000.—*F. H. Wiley, superintendent, electric division.*

Public Service of Colorado

THE $3,666,000 spent for electric department construction during 1941 is approximately equal to the entire domestic electric revenue received by the company, or about $33 per domestic customer, and represents the most intensive construction schedule in recent years. For 1942 $1,919,000 has been scheduled for new electric facilities, a major portion of which represents completion of construction begun during 1941.

Investments in 1941 included the following: a new 25,000-kw. turbo-generator with a complement of two 300,000-lb.-per-hr. boilers, coal pulverizing equipment and a 37,500-kva. step-up transformer bank were installed at Valmont Plant which went into service in December representing a capacity addition equal to 20% of the company's central system peak load. An inactive 600-kw. steam unit was moved from the Summit Plant to the Salida steam plant to provide additional standby for the hydro capacity of the San Luis Valley system. With these improvements the present generating capacity should be adequate to demand and no additions are contemplated for 1942.

Newly constructed transmission lines interconnected the Grand Junction system with the Central System of the company. Sections of the company's tie-line between plants in the San Luis district were reinsulated for 44-kv. operation, and a short length of 110-kv. line was extended to a new small arms ordnance plant of the U. S. government. Contingent upon availability of materials, plans are being considered for construction in 1942 of a new 44-mi. 110-kv. transmission line and terminal substation connecting Valmont Plant with North Substation in Denver and the company's Greeley Substation.

During 1941 a total of 42 mi. of distribution pole line were added, about 60% of which was for serving new residential areas in urban territory. Rural line extensions are likely to show further curtailment in 1942 due to scarcity of materials.

Total substation transformer installations during 1941 amounted to 14,000

kva. A 20,000-kva. outdoor type, hydrogen-cooled synchronous condenser was put in operation at the Denver Terminal Substation.

The company's system is interconnected with the USBR Kendrick system at Greeley from which dump energy is available in summer; and with the USBR Colorado-Big Thompson Green Mountain hydro plant at Dillon where generation of firm power is scheduled for 1943. With the use of all these interconnections, the energy requirements of the area should be met without restrictions.—*Guy W. Faller, president.*

Southern Colorado Power

PRINCIPAL ADDITION to this system in 1941 was the 7,500-kw. unit in the Pueblo steam plant which went into operation in September. This was authorized in 1939 and the principal equipment ordered that year. Construction began in May, 1940. The main units and principal auxiliaries are as follows:

BOILER—One four-drum, bent-tube, water walls on all sides, 425-lb. pressure, 750°, 90,000-lb. per hour unit.

STOKER—One 12-retort under stoker, with link grate section on the lower end and continuous ash discharge.

GENERATOR — One 7,500-kw. 3,600 rpm. 2,300-volt, 2,700-amp. unit, with direct connected 75-kw., 125-volt exciter.

TURBINE — One 7,500-kw., 400-lb. pressure, 750° total temperature 3,600-rpm. unit with design specifications and guarantee for 9,375 kw. load with above steam conditions and 4 in. *Hg.* absolute condenser pressure.

Except for this, all other expansion activities were of a normal character, being mainly distribution facilities. The 1942 program is of a similar nature.—*M. G. Lord, vice-president in charge of operations.*

Trinidad Electric

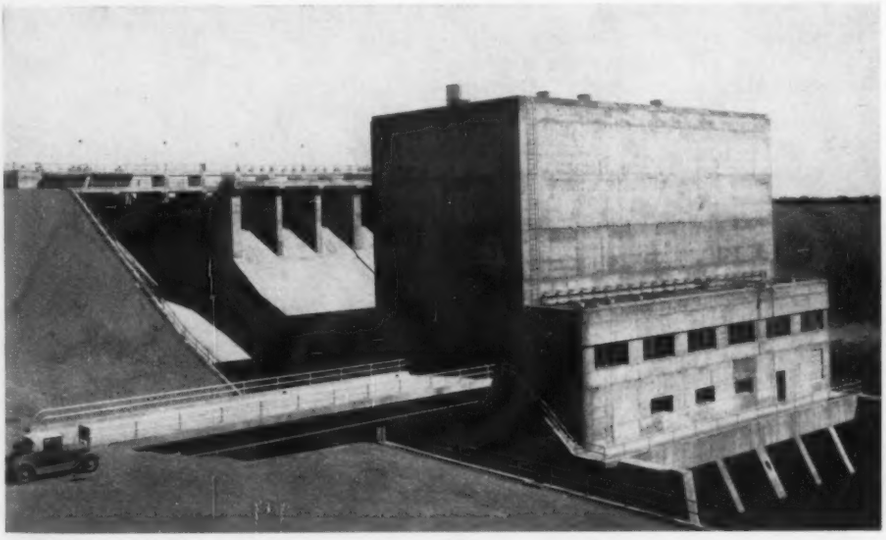
THERE is comparatively little to describe about our 1941 and 1942 plant expansion activities. A 10-mi. rural distribution extension serving 80 customers and costing $13,000 was built in 1941. It is hoped to increase the size of the substation serving Walsenburg, Colo., from 600 to 1,000 kva. during 1942. Extensions that may be contemplated later in the year will be governed by OPM rulings.—*Paul M. Brown, electrical superintendent.*

Idaho

Boise-Anderson Ranch Dam, USBR

BIDS were opened on July 7, 1941, for construction of the dam and power plant and contract was awarded to the low bidder on August 4. This dam and power plant, including power plant machinery to be installed by government forces, is estimated to cost about $14,600,000, and will require 4 to 4½ years to complete. It is located on the South Fork of Boise River about 20 miles above Mountain Home, Idaho. The dam is to be an earth fill and rockfill structure with a maximum height of 444 ft. The reservoir will have a capacity of 500,000 acre-ft. and will furnish a supplemental water supply for the Boise Project and will also provide flood control. The power plant will have an installed capacity of 26,000 kw.

When water began flowing in the All American Canal last year power generation started in the hydro plants of the Imperial Irrigation District. Power Drop No. 4 plant (below) has an installed capacity of 9,600 kw.; No. 3, has 4,800 kw.



Idaho Power

CONSTRUCTION costs for 1941 amounted to about $1,639,000, approximately $390,000 in excess of the estimated expenditures. With the defense program in mind, it is anticipated that construction work will have to be kept at a minimum in 1942 and construction forces placed practically on an operating basis only. However, it is hoped that some $850,000 can be utilized for system improvements and additions.

Generating capacity of the system was increased in 1941 in the modernization of the American Falls turbines by removal of pitting plates on turbine runners and metallizing of runners with stainless steel, thus increasing station capacity by 1,000 kw. Between Mountain Home and the Anderson Dam site 21 mi. of 167-kv. transmission line was constructed with a capacity of 3,000 kw. An additional 93 mi. of 167-kv. line between Montana-Idaho state line and Shelley Idaho was also installed with a capacity of 45,000 kw.

Distribution facilities were improved by the addition of approximately 520 mi. of new line extensions, practically all of which will operate at 7200/12,500 volts. A considerable amount of distribution reconstruction and modernization work was done throughout the system including the main items of reconstruction at Payette, Gooding and Nampa, Idaho, and Whitney Bench, a suburb of Boise. Present plans call for construction of not more than 100 mi. of new distribution lines in 1942, this amount being limited by materials restrictions of OPM.

Several distribution reconstruction jobs are scheduled for 1942 involving pole plant replacements and capacity increases.

New 11-kv. regulated feeders were added at Pocatello, Boise, Twin Falls and Midway substations and capacity was added to ten of the company's substations. One new 100-kva. substation was constructed at Lime, Ore., and 850-kva. was removed from the Jarbidge, Nev., substation. Plans for 1942 substation improvement include the addition of capacity to about 11 of the company's stations and improvement in relay equipment to permit higher settings of feeder relays and provide adequate transformer protection.

Several local district offices were remodeled in 1941 and the system transportation fleet was augmented. Nothing is contemplated in 1942 in the way of additions to or remodeling of office buildings or equipment.—*Henry L. Senger, chief engineer.*

At Piedra Substation in the San Joaquin Valley the Southern California Edison 220-kv. system was interconnected with the PG and E 115-kv. system last year for the delivery of 75,000 kw. to northern California. Power comes from Big Creek plants

Montana

Montana Power

IN 1941 Montana Power spent $1,594,000 for additions to plant principally for distribution and transmission, since no generating capacity was added. The budget for 1942 is $559,000. Principal item for 1942 is the raising of the transmission line voltage from the Kerr hydro plant to the Anaconda substation, a distance of 145 mi., from 100 kv. to 154 kv. The line was built for operation at the higher voltage. However, the change-over involves the installation of 90,000 kva. of auto transformers at the Kerr plant and 22,500 kva. of auto transformers at Missoula and the installation of 154-kv. circuit breakers for the Kerr line and the Anaconda-Grace line at Anaconda.

No new generating capacity is planned for 1942, but it is planned to replace the propeller type runners in the Black Eagle plant with runners of improved design in order to eliminate cavitation and increase the effective output of the plant. Completed in 1928, this station contains three 9,000-hp. turbines operating under 50-ft effective head. It is located near Great Falls.

Our defense load in 1942 will be increased by about 20,000 kw. for electrolytic zinc production and Great Falls and Anaconda and 3,000 kw. for the production of chrome ore in the southern part of the state.—*H. H. Cochrane, chief engineer.*

Nevada

Boulder Project, USBR

A TOTAL of $5,700,000 will be expended principally for additional payments on contracts for equipment for units A-1, A-2 and A-5, in completing the installation of unit A-2 and in the partial installation of unit A-5. Additional transformer equipment has been installed to supply power for the State of Nevada. The guide and exhibit building will be completed, dredging of the river channel below the dam will also be completed, fences and barriers will be constructed and other miscellaneous work performed. If a proposed supplemental appropriation is approved, it will be used to purchase equipment for units N-7 and A-3. Unit N-7 is to supply power for a magnesium plant, and unit A-3 for the development of strategic minerals.

Davis Dam Project, USBR

THE INITIAL appropriation for this project is $4,000,000 which is primarily for the development of power but will also provide river regulation. The need for additional power for national defense in Arizona and southern California will soon exceed the output of the Boulder and Parker power plants; therefore, construction of the Davis Dam project will be carried forward as rapidly as possible in order to supply this deficiency.

The project will include the Davis Dam and power plant on the Colorado River about 67 miles below Boulder Dam, and transmission lines connecting with the Boulder-Parker power system. The dam will be an earth and rockfill structure 1,350 ft. long and 138 ft. high above the stream bed, forming a reservoir of 1,600,000-acre-ft. capacity. The power plant will have an initial installation of four 45,000-kw. units with provision for future installation of an additional unit of the same size. Bids for construction of the dam and power plant will be received and construction should start early in 1942 and continue throughout the fiscal year. Specifications for purchase of power plant machinery will also be issued early in 1942. It is hoped to have the power plant in operation in the spring of 1945.

Sierra Pacific Power Co.

EXPENDITURES for new and improved facilities reached the approximate sum of $435,000 during 1941. The tentative budget for 1942 calls for $300,000.

Construction in 1941 included: installation of a 125-kw. diesel unit; replacement of wooden forebay and turbine runners at one hydro plant; 14 mi. of 60-kv. transmission line to supply new 3,000-kva. substation; 27 mi. of new distribution lines; three new substations of 3,000-kva., 1,000-kva. and 450-kva. capacity, respectively; installation of 1,150-kva. 60-kv. step type regulator; and modernizing a large part of the overhead street lighting in Reno and Sparks.

The largest item for 1942 is proposed construction of about 100 mi. of 6.9-kv. line to serve repeater stations on the Pacific Tel. and Tel. buried cable toll line. Forebays and flume headings will be replaced at three hydro plants. Step-up transformers at two hydro plants and some obsolete lightning arresters will be replaced.

It is expected that distribution system additions will be about one half normal because of limitations placed on all construction by priority control of materials in this non-defense area.—*V. D. Armstrong, engineer.*

New Mexico

Albuquerque G. and E.

DURING the last year this company experienced a normal growth, increases in both output and customers being 10% over the preceding year. Capital expenditures amounted to $170,000. Contemplated expenditures for 1942 are $300,000, this figure being de-

pendent upon our ability to obtain materials.

No generation was added in 1941. However, an additional boiler will be installed in the Albuquerque plant in 1942 at an estimated cost of $170,000. Three miles of 22 and 44-kv. line was built in 1941 to serve three new distribution substations built to relieve long and overloaded feeders. We added 22 mi. of distribution lines, mostly in short extensions. We cut in the three new substations mentioned above, total capacity being 2,000 kva. Two of these are equipped with induction voltage regulators and automatic feeder reclosing oil circuit breakers.

Plans for 1942 call for cutting over three feeders in Albuquerque to 4,150 volts to increase capacity and improve voltage regulation. This will involve reconnecting the generators for 4.150 volts with a consequent revision of the control and switchboard wiring. Estimated cost of this is $35,000—*Arthur Prager, president.*

Oregon

Bonneville Power Admin.

THE BONNEVILLE power development was undertaken for the purpose of making Columbia river power available over a wide area, to form the backbone of a regional power system and to encourage industrial development in the Northwest.

Recently the plans and growth of the system have been largely devoted to serving the national war-effort loads. Concentrations of these loads have developed in the Portland, Puget Sound, and Spokane areas.

Funds have been appropriated by the Congress amounting to $14,700,000 for the fiscal year ending June 30, 1941; and $22,000,000 was appropriated for the 1942 fiscal year, and an additional $30,000,000 of the 1943 fund was made available in advance. This acceleration of the BPA program is a reflection of the importance which is attached to Columbia river power in the national electro-metallurgical and electro-chemical activities.

During the calendar year 1941 the major system improvements included the installation of three additional 54,000-kva. generators in the Bonneville plant, and one 108,000-kva. generator at Grand Coulee.

A 230-kv. tie line between the Bonneville system and the Puget Sound systems has been placed in operation. A similar tie is being pushed to completion between the Puget Sound station at Covington and Grand Coulee.

The line between Grand Coulee and Bonneville and the two lines between Bonneville and Portland's receiving substation—J. D. Ross— are now operated at 230 kv.

A 115-kv. line has been energized to supply the Astoria area, including the Tongue Point Air Base and the Coast Guard Station at the mouth of the Columbia River. A line from a new substation in Yakima valley, called Midway, extends to Walla Walla at 115 kv.; and at lower voltage runs to Lewiston, Colfax, Pendleton, and the Pendleton airport.

Two additional 115-kv. lines were built connecting Bonneville plant to the Portland area. They are on the Oregon side of the Columbia River and will greatly increase the reliability of the power supply to war industries.

The sub-transmission system has been extended 188 miles to four additional substations.

The production of aluminum was accelerated by increases in the capacity of the Alcoa substation to 187,500 kw., and the Longview substation, to have have an ultimate capacity of 150,000 kw., has been developed to serve the Reynolds Metals Co. with 75,000 kw. Plans are being rushed to supply power to aluminum plants at Spokane and at Troutdale near Portland.

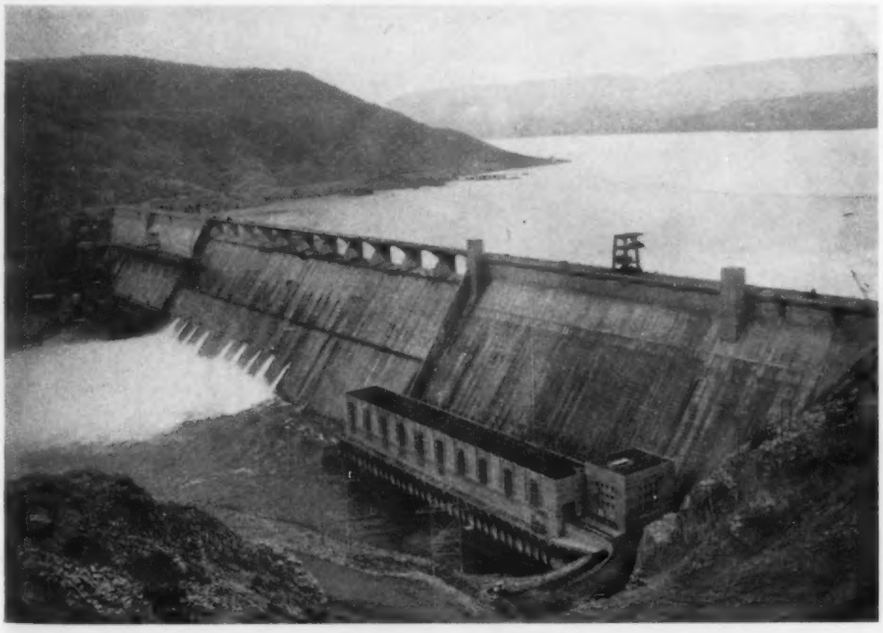
Additional inter-ties have been added between municipal systems and public utility districts whose aggregate contract demands total 5,000 kw.

The 230-kv. system has its lines protected by three-cycle circuit breakers actuated by directional distance and directional ground relays. Carrier current relay protection is planned.

Pilot wire relay protection is applied to the Columbia river crossings at Bonneville. The majority of the 115-kv. lines are protected by directional-distance and directional-ground relays. Several buses and transformers are protected by a recently developed harmonic restraint type of relay. Other buses are protected by differential relays of a new type having six restraining coils. Current balance relay protection is applied to the lines between the J. D. Ross substation and Alcoa substation.

Substation capacities were increased by the addition of another transformer bank of 30,000-kva. capacity at the St. Johns substation in Portland, and a similar bank with a 20,000-kva. synchronous condenser at the Salem substation.

Power generation began in 1941 at Grand Coulee, which will be the world's largest power house when completed. Two of the 108,000-kw. units are operating with a third almost ready. Six others are ordered and work started on the left powerhouse



Bonneville Dam, U. S. Army

CONTRACTS were awarded during 1941 for four 74,000-hp. turbines and governors, four 60,000-kva. generators, seven 115-kv, 60,000-kva. transformers, as well as other electric equipment necessary virtually to complete the installation of generating equipment in the powerhouse at Bonneville.

The original program embracing six units has been completed. Units 1 to 5 inclusive are in production at the present time. Unit 6 is completed and will be put into operation as soon as the cofferdam on the downstream side of the powerhouse can be removed. It is estimated this can be done by February 1, 1942.

Construction of the extension to the powerhouse structure is approximately 50% complete. Completion is scheduled for 1942. The completion dates of Units 7, 8, 9 and 10 are staggered and cover a period from April 1943 to the latter part of 1943. As these units are completed, each pair will be connected in one bank system of three single-phase 60,000-kva. transformers which will step up the energy for transmission at 115-kv. The final completion in 1943 of all ten units will give Bonneville a rated maximum capacity of 518,400 kw. —*C. R. Moore, Lt. Col., Corps of Engineers, district engineer.*

California Oregon Power

THE CONSTRUCTION budget for 1941 was $1,212,000 and the increase in connected load for the year over 1940 was 29,280 kw. Major transmission construction covered the rebuilding of existing lines to maintain reliable service and eliminate hazards. The Gold Ray Dam was rebuilt. The company also added 288 mi. of distribution line to the system and 4,500-kw. were added in substation capacity near Klamath Falls, Ore.

During 1942 it is estimated that $78,000 will be spent for transmission construction and about $448,000 for distribution construction. Of the latter amount about $300,000 will be spent for new business. Included in the 1942 budget is the sum of $100,000 set aside for substation equipment and plans are being made for a 5,300-kw. substation in the vicinity of Medford, Ore.—*J. C. Boyle, vice-president and general manager.*

Eastern Oregon L. & P.

THERE will be a slight decrease in our 1942 construction program as compared with 1941 expenditures. An itemized comparison for the two years follows:

	1941	1942
Generation	$ 1,000	$ 3,000
Transmission	2,500	6,500
Distribution	56,000	42,500
Substations	500	4,000
Miscellaneous	500	1,000

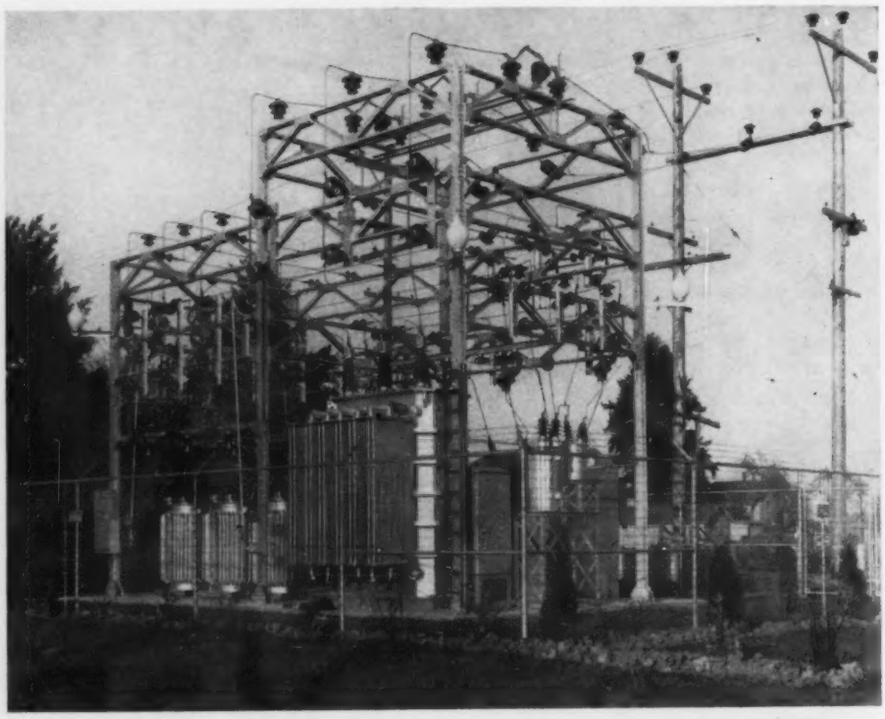
As will be noted, the major expenditures are for distribution. A total of 24 mi. of new lines were added in 1941 and 10 mi. are projected for 1942. Minor increases in substation capacity and voltage regulators for rural lines are anticipated in 1942.—*O. D. Lanning, chief engineer.*

Eugene Water Board

ADDITIONS and improvements to the system during 1941 included the installation of a 7,500-kw. turbo-generator and boiler designed for either hogged fuel or oil; an outdoor 5,000-kva. substation going into service January 1942; about 5 mi. of distribution line, and one rural line, 9 mi. in length, was increased from 2.4 kv. to 11 kv.

Because of considerable growth in 1941, feeders from the substations will have to be enlarged and rearranged and some $240,000 has been budgeted for improvement of the distribution system. In keeping with the government's request that the system be expanded as little as possible, rural extensions will be held to a minimum and no plans made for increased generation.

Last year residential customers increased 9.2% and average kwh. per customer is estimated at 2,700. Number of residential customers using electric ranges, 53.8%, and those using water heaters, 27.4%.—*J. W. McArthur, general superintendent-secretary.*



Six Corners substation was one of several completed by Portland General Electric last year. It has a capacity of 3,000 kva., 57/24 kv. and 600 kva. 24/2.4 kv.

Mountain States Power Co.

APPROXIMATELY $733,000 was expended by this company in 1941 on capital additions and the expansion of rural distribution facilities. Some 210 miles of distribution facilities were completed. In addition to the completion of a 2,500-kw. steam unit at Dallas, Ore., a 5,000-kw. steam unit was installed at Springfield, Ore.

During 1942 an anticipated approximate expenditure of $486,000 is expected to include a 2,500-kva. substation at Sweet Home and a 6,000 to 10,000-kva. substation at Albany; 100 miles of new distribution facilities and a 12.8-mi. transmission line from Lebanon to Sweet Home. The company also intends to install a standby connection with the City of Eugene, Ore.—*G. McClellan, chief engineer.*

Northwestern Electric

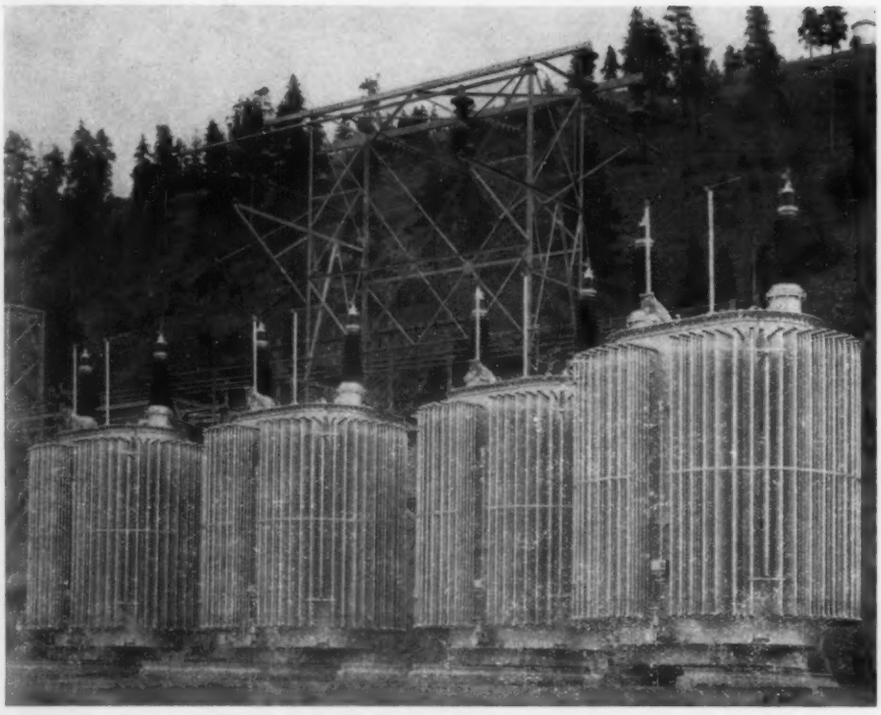
NORTHWESTERN Electric Co.'s budget for 1941 was $423,560. The estimated budget expenditure for 1942 is $310.010.

GENERATION—The only addition to generation plant in 1941 was the installation of a closed type feedwater heater of 600,000-lb.-per-hour capacity at Lincoln Steam Plant. No additions are planned for 1942.

TRANSMISSION—In 1941 replacement of a 148-ft. tower on the Camas-Fairview 66-kv. Columbia River crossing was made with a new 255-ft. steel tower using a guyed radio mast design, thereby saving 23,000 lb. of steel over what would have been required to raise the old tower. The additional clearance was made necessary on account of deepening the river channel to provide navigation for ocean going vessels. The old steel conductors on this crossing were replaced with No. 3/0 copperweld.

In 1942 we propose to rebuild approximately ten miles of the Condit-Camas 66-kv. transmission line which was built in 1912-1913. This line is 48 mi. long and will be entirely rebuilt over a five-year period.

DISTRIBUTION — Thirty-two miles of distribution lines, 11-kv. and under, were built in 1941. This figure includes



Substation capacity was increased on most all Western systems in 1941. This station was built by Washington Water Power and is typical of modern substation design

½ mile of submarine cable, approximately 3½ mi. of 11-kv. tie lines, and approximately 6 mi. of 11-kv. feeders.

Approximately 16 mi. of distribution lines are budgeted for 1942.

SUBSTATION AND EQUIPMENT—A total of 25,950 kva. of substation capacity was added to the system in 1941. This included our new Portsmouth Substation with three 5,000 kva., 66-kv. to 11-kv. transformers and the installation of three 3,333-kva. three-winding transformers, 66 kv. 11kv. 2.4 kv. at our Stark Substation. The remainder of the capacity consisted of 11-kv. to 2.4 kv. transformers at various substations. In 1942 5,385 kva. of substation capacity will be added. In addition, between 2,000 and 10,000 kva. of 2,400-volt shunt capacitors in 15-kva. units will be installed for power factor correction and to relieve overload on distribution feeders.

OTHER SYSTEM IMPROVEMENTS—Miscellaneous improvements in 1941 consisted of (a) telemetering and remote control equipment installed between Portsmouth 66-kv. substation and Albina Substation; (b) two-way radio communication facilities between the service department and line trucks and trouble cars; (c) purchase of ornamental street lighting equipment in the City of Portland previously financed by property owners.

Miscellaneous improvements in 1942 will consist of: (a) Improvement of S. W. Front Avenue for use as an arterial highway has necessitated the relocation of the nearby overhead and underground distribution lines and the Albina Lincoln 66-kv. tie line. (b) Part of the underground distribution system in the downtown business district of Portland will be cut over to a 4-wire 120-208-volt interconnected secondary network with 11-kv. primary mains. (c) The Northwestern Electric Co. and the Portland General Electric Co. will consolidate their direct current feeder systems, and when completed, all the direct current load for the downtown district in Portland will be generated in the Pittock Station of Northwestern. Portland G-E will purchase the energy for its d-c customers and abandon its present Alder Street d-c substation.

The strict enforcement of priorities will make the utility operators' task a difficult one, but with our country actually at war we feel that customers adversely affected will take a logical view of any forced sacrifice on their part.—*O. L. LeFever, general superintendent.*

Pacific Power & Light

PACIFIC COMPANY spent for construction during 1941 approximately $936,000. The amount estimated for similar work during 1942 is $674,100. No generating capacity nor any transmission lines were built during the past year and nothing is contemplated for 1942.

Major expenditures were for distribution facilities. Approximately 56 miles of rural lines were built. A total of $686,000 was spent for distribution equipment, of which $410,000 was for expanding service facilities to customers not previously served, including rural extensions.

One 10,000-kva., 115/69-kv. three phase transformer was installed at Hanford, Wash., to augment the capacity of this station to handle the main power system load. There were also several increases in transformer capacity at other locations to provide for load growth. The total net increase in substation transformer capacity amounted to 12,725 kva.

Construction in 1942 will be mainly for distribution plant. Due to priority and conservation restrictions distribution line extensions will be limited, except where direct defense loads are involved. The total customer growth expected for 1942 is 1,476 which is somewhat less than the increase last year. Extension of rural service will be severely limited and will be reflected in a smaller gain in farm customers.

Pacific company does not serve any large industrial centers, hence defense preparations have not materially affected its load. Some areas within the company's territory have recently been classified as defense areas due to the proximity of large military or naval establishments and extraordinary expansion of distribution facilities has been necessary to serve temporary construction loads as well as housing facilities—*H. H. Schoolfield, general superintendent.*

Portland General Electric

CONSTRUCTION expenditures for 1941 totalled $2,138,400. The amount budgeted for 1942 is $1,650,000. Expenditures and estimates for this year are broken down as follows:

	1941	1942
Fuel power stations....$	12,000	$ 10,000
Water power stations...	25,000	10,000
Transmission lines	99,300	225,000
Substations	749,500	363,000
Distribution system	1,125,000	995,000
Miscellaneous building.	127,600	47,000

No generation capacity was added during 1941, nor is any contemplated for 1942. In line with company policy, it is planned to continue cooperation with the Bonneville Power Administration in the utilization of capacity which has been developed by the U. S. government on the Columbia River.

During the last year there was added 75 pole line miles of 57-kv. transmission circuits, and 175 pole line miles of distribution circuits. A total of 36,000 kva. was added to the system transmission substation capacity and 24,000 kva. to distribution substation capacity. The preponderance of expenditures for

both years, as noted in the tabulation, covers additions to the distribution system. About the only departure from previous practice during 1941 was the purchase of 15,000 kva. in shunt capacitors. There will be some additional capacity in shunt capacitors added in 1942.—*Walter Brenton, chief engineer.*

West Coast Power

DIFFICULTY of procuring new equipment will prolong life of existing equipment and may bring some retired equipment back into service during 1942. Many requested extensions will not be constructed, especially of the rural type, and actual new construction expenditures in 1942 will probably be less than budgeted amounts.

One steam boiler was installed in one plant in 1941 but nothing in the way of generation construction is planned for '42. Voltage on one 22-kv. 25-mi. line was raised to 44 kv. during 1941 and it is proposed to build a short 44-kv. line to replace an 11-kv. line and to wye a 22-kv. 15-mi. line. Some major distribution lines were reconstructed and 70 mi. of new line added. Plans for 1942 include construction of 10 mi. of new line.

Approximately 1,500 kva. of transmission substation was added in 1941 and installation of approximately 500 kva. is proposed for 1942. During 1941 one new regulator installation was made, distribution substation transformer capacity increased 2,000 kva. and an additional set of capacitors was added to an existing set. Two new installations were also made. Two installations are also scheduled for 1942 along with special protective equipment for three substations, two new regulator installations and 1,000 kva. increased distribution transformer capacity.

Overhead wire lightning shields were constructed at two plants in 1941 and another installation is proposed for 1942.—*L. C. McClurkin, president.*

Bonneville Transmission System

From	To	Circuit Miles	Conductor	Const. Voltage in Kv.	Status of Construction
North Bonneville	Grand Coulee No. 1	234.0	795,000 cm ACSR	230	C
Vancouver	Kelso	41.2	795,000 cm ACSR	230	C
Kelso	Chehalis	30.2	795,000 cm ACSR	230	C
Chehalis	Raymond	45.5	250,000 cm cu	115	C
Chehalis	Covington	69.4	795,000 cm ACSR	230	C
Bonneville	The Dalles	38.7	397,500 cm ACSR 250,000 cm cu 795,000 cm ACSR	115	C
Vancouver	Alcoa No. 1	8.4*	556,500 cm ACSR	115	C
Vancouver	Alcoa No. 2	7.8*	500,000 cm cu	115	C
Salem	McMinnville	21.7	3/0 ACSR	69	C
Chehalis	Centralia	11.1	1/0 ACSR	69	C
Salem	Monmouth	13	1/0 ACSR	12.5	C
Covington	Tacoma	13.1	397,500 cm ACSR	115	C
Bradford Island Crossings	No. 1 and No. 2	1.2	801,900 cm ACSR	230	C
Bradford Island Crossing	No. 3	.9	801,900 cm ACSR	230	C
Bradford Island Crossing	No. 4	.9	801,900 cm ACSR	230	UC
Chehalis	Mossy Rock	24	No. 2 ACSR	69	UC
Midway	Ellensburg	64.1	250,000 cm cu	115	C
St. Johns	Astoria	81.2	250,000 cm cu	115	C
Covington	Seattle	11.2	795,000 cm ACSR	230	C
Midway	Walla Walla	81.8	250,000 cm cu 397,500 cm ACSR	115	C
Bonneville	Oregon City	102.4*	350,000 cm cu 556,500 cm ACSR 795,000 cm ACSR	115	C
St. Johns	Salem	58.2	250,000 cm cu 350,000 cm cu 397,500 cm ACSR 801,900 cm ACSR	115	UC
Walla Walla	Lewiston	80.5	250,000 cm cu	115	C
Lewiston	Colfax	37.8	250,000 cm cu	115	C
Walla Walla	Pendleton	39.3	3/0 ACSR	69	C
Covington	Grand Coulee	183	795,000 cm ACSR	230	UC
Bonneville	Vancouver No. 1 & No. 2	71.8	795,000 cm ACSR	230	C
Vancouver	Eugene No. 1 & No. 2	132.1	250,000 cm copper 350,000 cm copper 397,500 cm ACSR	115	C
Columbia Willamette Crossings		5.8*	801,900 cm ACSR	230	C
Pendleton	La Grande	49.2	250,000 cm copper	115	UC
Bonneville	Coulee No. 2	234.0	500,000 cm copper	230	UC

Utah

Telluride Power Co.

DURING 1942 we spent about $125,000 for new and improved facilities. Present indications are that unless some defense projects develop in this area, 1942 expenditures will not exceed half this amount due to priority regulations. If some of the extensive alunite deposits in this region should be developed, it would be necessary to increase the capacity of the system.

An old water wheel at one generating station was replaced in 1941, with an increase in capacity of 100 kw. Work was begun on the cutover of a 650-kw. hydro plant to automatic operation. Two tungsten mines were connected to the system by 5.25 mi. of new 44-kv. line. About 20 mi. of new distribution line were added and 10 mi. rehabilitated.—*Paul P. Ashworth, chief engineer and assistant general manager.*

Utah Power & Light

CONSTRUCTION activities in 1941 covered a wide range, principally in additional transmission and distribution facilities. One isolated generating plant received a new 250-kw. diesel unit; otherwise there was no new capacity.

Transmission expansion included 57.3 mi. of 161-kv., 250,000-circular mil wood pole line and 8 mi. of 44-kv. wood pole line. The distribution system received 130 mi. of additional circuits. Transmission substation capacity was increased 45,000 kva., distribution substations, 2,600 kva. and regulator capacity 1,328 kva.

Plans for 1942 will be governed to a marked extent by the availability of materials and whether loads are of a defense character.

Planned but not yet authorized for 1942 are 12.6 mi. of 44-kv. wood pole transmission line, some additional distribution facilities, 750 kva. of regulator capacity and 3,000 kva. of distribution substation transformer capacity.—*L. B. Fuller, chief engineer.*

Washington

Columbia Basin Project, USBR

CONTRACT for completion of Grand Coulee Dam and left powerhouse building were completed in December, 1941. Installation of power plant equipment and construction of switching facilities by government forces will continue. Unit L-3, the first of the 108,000-kva. units, was placed in operation late in September 1941; a second was ready in January and a third is expected in March. Contracts were awarded late in July for turbines, generators, transformers, etc., for three more 108,000-kva. units, and it is hoped these will be furnished in time for installation by the fall of 1943. Contracts also were awarded from supplemental funds for three more units, bringing the total to nine. Penstocks and foundation for the right powerhouse were placed by the dam contractor, and contracts for the superstructure so that it will be ready for the installation of some of the units in 1943.

Puget Sound P & L

DURING 1941 Puget Sound spent approximately $4,000,000 on construction work. With the rapid develop-

Bonneville Transmission System

Bonneville	Vancouver No. 3	35.0	795 000 cm ACSR	230	UC
Bonneville	Vancouver No. 5 & No. 6	74.0*	500,000 cm copper	115	UC
Chehalis	Longview	35.2	350,000 cm copper	115	C
Rainier	Longview	11.6	262,960 cm ACSR 250,000 cm copper	115	UC
Coulee	Spokane No. 1 & No. 2	166.0	350,000 cm copper	115	UC
Bonneville-Vancouver No. 1 Loop	Troutdale	14.0	795,000 cm ACSR 500,000 cm copper	230	UC
Bonneville-Oregon City Tap	Troutdale	14.4	350,000 cm copper	115	UC

C—Completed. UC—Under Construction *—Double Circuit.

Major Bonneville Substations

Equipment in Service as of Jan. 1, 1942

Location or Name	Transformer Capacity Kva.	Condenser Capacity Kva.	Voltages Kv.
Albany	1,000		115- 12.45
Alcoa	187,500		115- 13.8
Cathlamet	1,000		33- 11
Chehalis	75,000 12,000		235-115 115- 66
Colfax	1,000		115- 12.45
Cosmopolis	12,000		66- 23
Ellensburg	3,000		115- 6.9
Forrest Grove	1,500		22- 2.4
Long View	75,000		115- 13.8
McMinnville	3,000		57- 2.4
Midway	50,000		230-115
North Bonneville (switching)			115-115 230-230
Naselle (switching)			33- 33
Oregon City (switching)			115-115
Pendleton	3,000		6.9- 12.45
Pendleton Airport	1,500		12.45- 2.4
Raymond	12,000		115- 22
	3,000		22- 33
Raymond Tide Flats	3,000	7,500	22- 2.4
J. D. Ross	150,000	35,000	220-115
Salem	30,000 1,000	20,000	115- 57 57- 12.45
The Dalles	1,000		115- 12.45
Walla Walla	7,500		115- 6.9
	1,000		6.9- 12.45

ments occurring in defense activities and in the absence of knowledge as to the ultimate extent thereof, as well as the rapidity of its acceleration, it is practically impossible to forecast accurately either power requirements or estimates of facilities to be constructed during 1942. The situation is further complicated by the uncertainties of allocations and deliveries under OPM restrictions.

One of the most important 1941 projects was the re-installation of two generators at the Electron hydro plant totalling 12,500 kw. of capacity, and the completion of the rehabilitation of 6.5 mi. of the Electron flume. Another vital project was the extension of the White River-Wenatchee 110-kv. line from the White River plant to the Renton switching station. This involved converting 14.2 mi. from 55 to 110 kv. and constructing 4.9 mi. of new 110-kv. line, as well as in the installation of a 30,000-kva., 110/55-kv. transformer bank.

To provide for growing industrial load in the southern section of Seattle, a 7,500-kva., 55/13.8-kv. substation was built. In the Bremerton area where the defense expansion has been abnormal, a new 6,000-kva., 66/6.9-kv. substation was constructed.

Other additional facilities in 1941 included 36,000 kva. of distribution transformer capacity and 224 mi. of distribution lines. The number of customers increased 15,475.—*Frank McLaughlin, president.*

Seattle City Light

CITY LIGHT has budgeted $1,600,000 for extensions in 1942. Much of this is associated with either defense work or load growth. In 1941 expenditures were approximately $1,000,000.

Both generating and transmission facilities are adequate for present and immediate prospective loads. In 1941 a 220-kv. jumper tap was made to the Bonneville system with the work done by the Bonneville Power Administration. The Tacoma tie line was re-insulated from 55 to 110-kv. for a distance of 10 mi. and changed from standard crossarm to wishbone configuration. On the distribution system 52.6 mi. of secondary and 43.8 mi. of primary wiring were installed.

At the South Receiving Station the Tacoma tie line bank was increased by 45,000 kva. of self-cooled and 60,000 kva. of forced air-cooled 110/55-kv. transformers. In addition a 69-kv. oil circuit breaker and a 110-kv. gang operated disconnect were installed.

Plans for 1942 contemplate a $700,000 extension to this station. This will include a 60,000-kva., 220/26-kv. main transformer bank and two 220-kv., 1,500,000-kva. rupturing capacity oil circuit breakers to control the aforementioned bank as well as a second which is now in service. Two 22,500-kva. banks will be relocated to new steel racks and will receive new breakers and disconnects. In addition two 69-kv. breakers and disconnects will be installed on the Cedar Falls line. Several sections of metalclad switchgear will be installed in the present substation building.

Additions ranging up to 4,500 kva. will be made to four residential substations, including regulators and automatic reclosing equipment. Plans and specifications are being prepared for two standard automatic 12,000-kva., 26/4.4-kv. substations with metalclad switchgear and regulated feeders. The lines and banks will be in a concrete enclosed switchyard and the metalclad switchgear, regulators and rectifiers will be in a substation building. All lines and feeders will be underground. The two stations will be identical except that one will have two 300-kw. rectifiers for trackless trolleys. The approximate cost is $300,000.

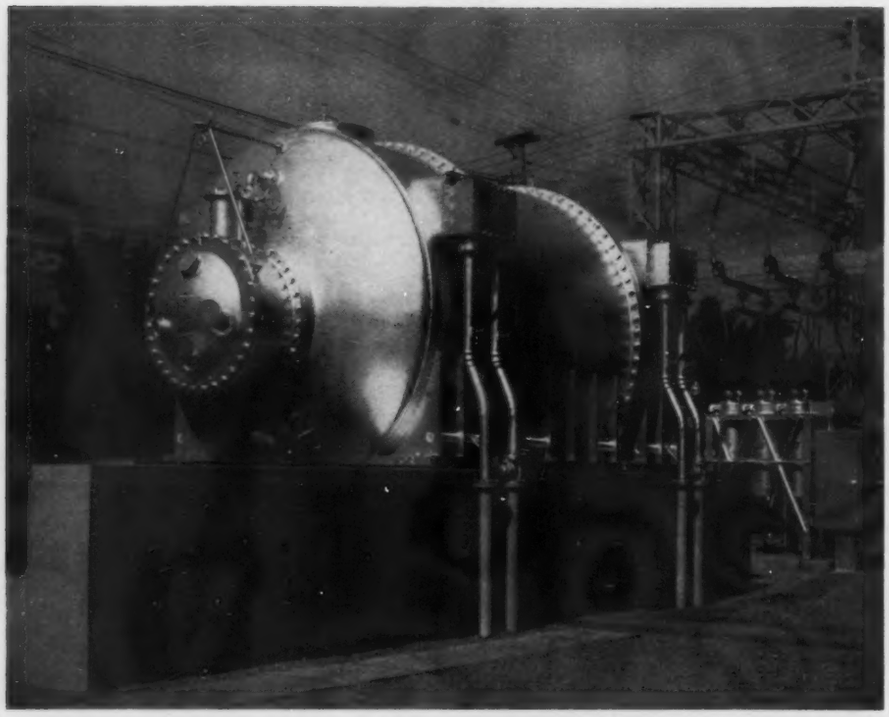
Approximately $100,000 is to be spent at North Receiving station and the steam plant for additional substation capacity. In addition $500,000 has been appropriated for a new substation in the basement of the City Light Building. The defense program and priorities may hold up completion of this station in 1942.—*E. C. Hoffman, superintendent of lighting.*

Tacoma Light Dept.

DURING 1941 Tacoma authorized construction of and started preliminary work on its new $11,000,000, two-dam, 90,000-kw. hydro project on the Nisqually River, just above its present 24,000-kw. stream flow plant at La Grande, Washington. This will increase the present 114,000 kw. of hydro to 204,000 kw., and the prime hydro generation of 450,000,000 kwh. to 780,000,000, all supplemented by 34,000 kw. of steam standby now installed. In the aggregate, upon completion of the new project, Tacoma will have 238,000 kw. of hydro and steam capacity, an increase of sixty percent over the present.

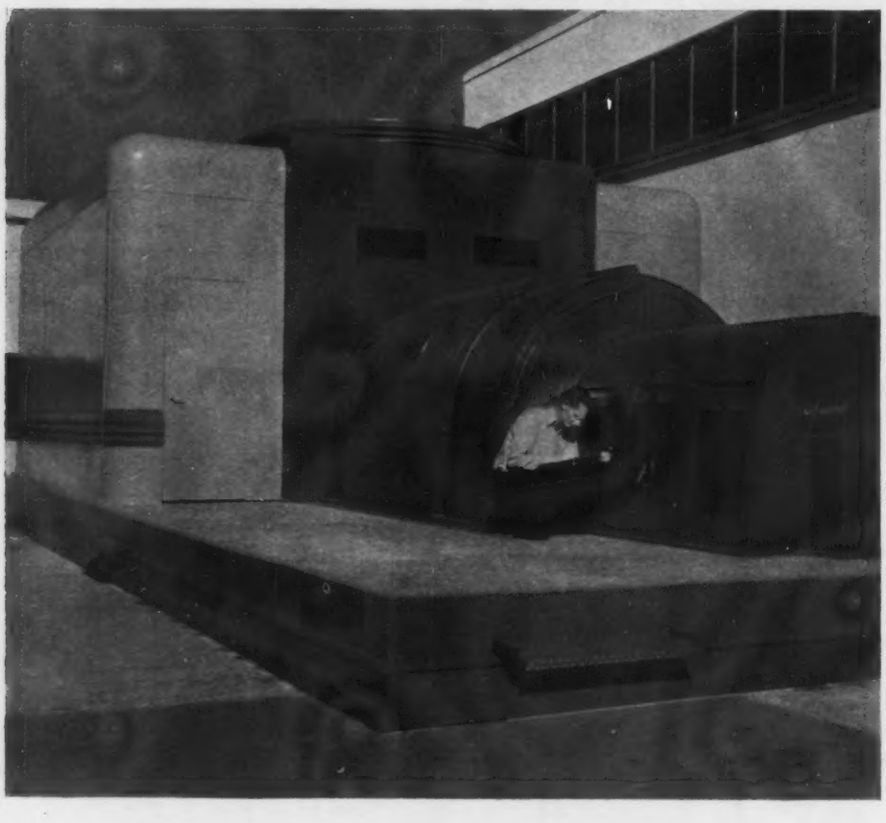
In further anticipation of increased power requirements, and in keeping with the trend towards interconnection, Tacoma and Bonneville were intertied at 110 kv. early in 1941, to permit the interchange of surplus power between the two systems. Similarly, the Tacoma-Seattle intertie formerly operating at 50 kv., was reconstructed and is now operating at 110 kv. with a capacity of from 45,000 to 60,000 kva.

In 1941 Tacoma added 72,000 kva.



Public Service Co. of Colorado added this 20,000-kva. synchronous condenser to its Denver Terminal substation last year to improve system transmission efficiency

Particularly noteworthy is this unique outdoor 10,000-kw. Allis-Chalmers turbo-generator installed by the Burbank Public Service Dept. It is the first of three similar units. In the foreground are the main and pilot exciters; then comes the generator with the turbine in the demountable sound-proofed housing at the rear



of 110,000 to 13,000 volt transformer capacity; 34,500 kva. of 50,000 to 13,000 and to 4,000-volts; and 12,100 kva. of 13,000-volt miscellaneous power transformers. Plans for 1942 include the addition of 84,000 kva. of 110,000 to 50,000-volt transformers, and two 20,000-kva. synchronous condensers. Plans for 1942 also include the construction of about 35 miles of 110-kv., double-circuit, steel-tower transmission line; and rapidly accelerated progress on the new Nisqually development, referred to above.

It is expected that for 1941 Tacoma's gross generated and received will be about 615,000,000 kwh., of which about 83½ percent are sales, an increase in the gross of probably 22 percent. In spite of the large percentage of industrial sales, the revenue will show an increase of about 15½ percent. All in all, this has been a highly successful and record breaking year for the Tacoma Department of Public Utilities.—*Verne Kent, superintendent.*

Washington Water Power

GROSS electric construction expenditures for 1941 are estimated at $1,837,500, with $1,585,000 estimated for similar work in 1942, dependent on availability of material for completion.

During the latter part of 1940 and in 1941 every effort was made to prepare the system for full utilization of generating and transmission facilities in anticipation of the increased requirements of the many defense industries and to prepare for predicted hydro shortage. Owing to the impracticability of installing added capacity, this work was confined to the installation of a waterwheel and generator previously removed from service in one of the smaller plants and the rewinding of one generator to add 2,750 kw. Both of these jobs are scheduled for service early in 1942. A 10,000-kw. steam turbo-generator was installed during the past summer in one of the larger lumber mills, which provided capacity for all mill operations and made 4,000 kw. in addition available to the system. Flashboards added to the control dam of one of the principal reservoirs provided 30,000,000 kwh. additional, and flashboards on several other dams increased storage and extended peak capability. Other improvements in water supply were accomplished by dredging in forebay, rebuilding of a leaking timber dam and flume and installation of new trash racks. Installation of a remote control headgate at one station is scheduled for early 1942 completion, as well as other work of this nature.

Penstocks were inspected and rein-

forced to insure continuity of service. A badly cavitated runner was replaced. Draft tubes were vented, which accomplished considerable saving when generators were used as condensers for power factor correction and load control. Oil circuit breakers, disconnecting switches, and other electrical mechanism were overhauled or replaced. Cable reactors were installed where required and regulators and automatic operators were rehabilitated. Transformer cooling coils were cleaned to insure outlet for the entire generator capacity and generator rooms ventilated.

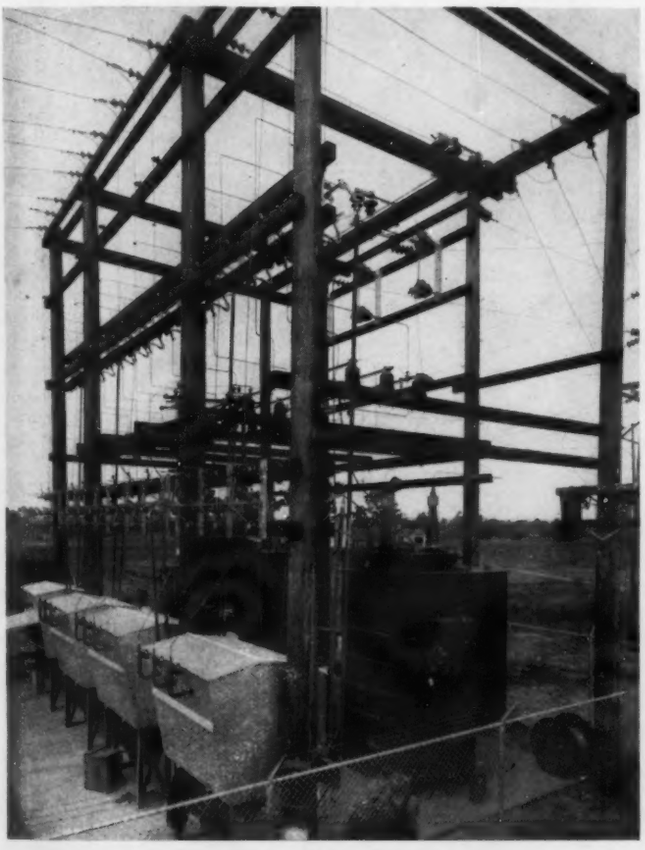
Interconnections with several lumber mills maintaining generating facilities were accomplished with one more scheduled for 1942. Energy from waste fuel is thereby made available during the storage season, and some economical addition to system peak capacity made.

No extensions of the transmission system have been made, but a twenty-mile 110-kv. line will be constructed between Kellogg and Burke, Idaho, to increase interchange capacity with The Montana Power Co. Rehabilitation of the Milwaukee Railroad 110-kv. line increased the reliability of the inter-connection with the Puget Sound Power & Light Co. Relays at various sectionalized points were reset and checked to insure maximum capability within the stability limits of the circuits involved. Installation of 10,000-kva., 2,300-volt outdoor capacitors to remove reactive power, and installation of load control equipment is anticipated. This will enable operation of interconnected facilities at much higher load levels.

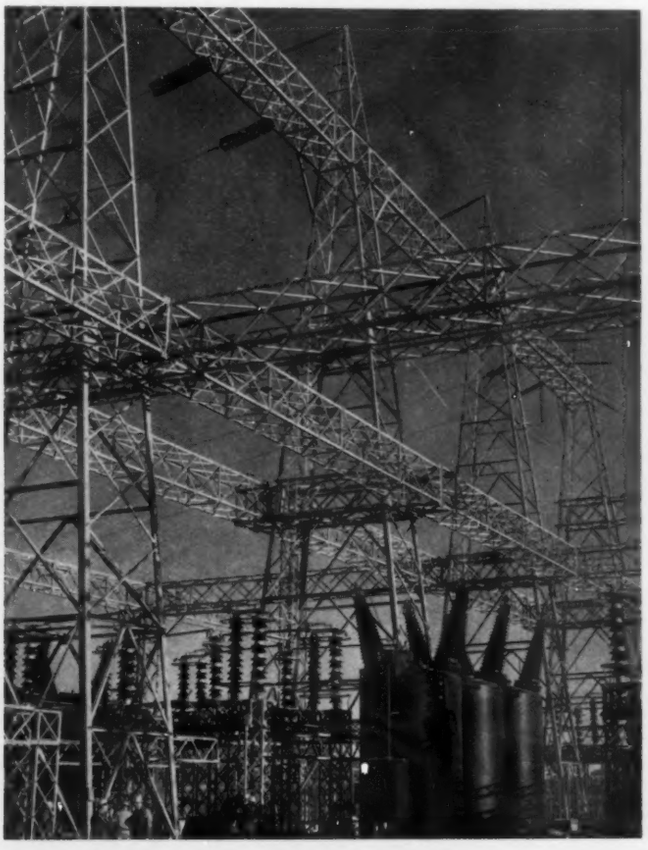
No major changes or additions to distribution facilities were made in 1941, and only changes due to customer requirements and defense conditions are anticipated.

Part of the material and equipment required for budgeted construction is at hand and commitments have been secured on part remaining. The balance, and any other work not now scheduled, will depend on receipt of materials under priority restrictions, which cover practically all of the material essential to electrical construction. This will limit construction to work essential to National Defense.

It will be seen that many of the improvements outlined have been devoted to increasing capacity of facilities for interchange. For some time several systems in the Northwest have pooled resources, which has materially increased the energy and demand capability of each and of the pool as a whole. Further interconnections, particularly with the great governmental developments, would undoubtedly provide an additional reservoir of power and facilities sufficient to permit the expansion of national defense industries at least as fast as these new loads could be developed, and at the same time care for all the normal requirements of present customers.—*J. E. E. Royer, vice-president and general manager.*



Among the new substations built by Northwestern Electric was Portsmouth station shown above. The installation consists of three 5,000 kva., 66/11-kv. transformers. At the time picture was taken the third transformer had not been placed



Outgoing circuits from Grand Coulee Power House take off from this switchyard for Bonneville and the Puget Sound area. Soon lines will go to defense plants near Spokane. The switchyard will soon rival the one at Boulder Dam for size

Picture Acknowledgements

Photos on the preceding pages are from the following sources: p. 44, Washington Water Power Co.; pp. 48 and 49, U. S. Bureau of Reclamation; p. 52, Los Angeles Bureau of Power & Light; p. 53 Imperial Irrigation District; p. 54, Pacific Gas an d Electric Co.; p. 55, USBR; p. 56, Portland General Electric Co.; p. 57, Washington Water Power Co.; p. 60, Public Service Co. of Colorado and Allis-Chalmers Mfg. Co.; p. 61, Northwestern Electric and USBR.

Where do we go from here?

1941 was a record breaker. Then came war. Even before Dec. 7 there had been withdrawals to a new line of defense. After "Pearl Harbor" we went all-out for war. What the future holds is anybody's guess, but herein are the ideas of the West's sales executives along with 1941's figures.

ONE hour before the first blackout many utilities experienced the highest peak in their system history. The blackout dropped their loads like a dive bomber its bombs.

That was characteristic of 1941. Up to October sales of electrical appliances reached all-time highs. Then came Regulation W to tighten terms. Sales sagged a bit from the overselling of October to beat the deadline, but started to recover when the attack on Pearl Harbor ended all doubt as to our being in the war. Sales then took a nose dive in the blackout.

Later January sales were coming out of the dive, but the anti-aircraft of still more stringent restrictions and production curtailment will make future sales gliding precarious in 1942. It will take skillful dealer piloting to keep aloft these days ahead.

As early as midyear more and more utilities dropped out of merchandising of appliances to leave the available stocks for dealers to sell and keep going. A larger proportion of the sales reported for last year were dealer sales. This year what sales are made more generally will be made by dealers. Sales reported herein are later and more complete than those given earlier in *Electrical Merchandising*. In a few instances the final figures were less; usually they were very close to the earlier estimate.

In last February's estimates for 1941, published here, range sales were estimated to reach 76,250, water heaters 39,542, refrigerators few ventured to guess. Based on national manufacturers' figures there were sold in the West 122,158 ranges, 430,850 refrigerators, 283,215 washers. From the utility reports received plus an allowance for those not reporting, ELECTRICAL WEST estimates 87,000 ranges, 47.000 water heaters, 350,000 refrigerators and 200,000 IES lamps. Average annual kilowatt-hour increases per residence consumer continued upward. Few utilities remain with less than 1,000 now.

The tables summarize these reports and show many interesting trends and changes from last year. The supplementary comments by the sales executives explain many of the items and discuss changes in policy and promotion which may have affected the results and will guide the program for 1942. Everything these days is subject to change without notice, of course, but in these pages is condensed the considered opinion and the planning of the electrical industry in the West, as of Feb. 1, 1942. It is a courageous plan in the face of the unknowns.

Ninth Annual Christmas Exposition of San Diego Bureau of Radio and Appliances

Arizona

Arizona Edison

Arizona Edison Co., Inc., of Douglas, Ariz., is making few plans for appliance promotion in 1942 due to the increasing difficulty of securing equipment. New business activities will be taken care of in the various divisions, where individual managers will base programs upon local conditions. Average annual electric consumption for domestic customers in 1941 was 722.6 kwh., an increase of 11.5 kwh. over the previous year.

Tucson G E L & P

Residential customers of Tucson Gas, Electric Light & Power Co. used an average of 1014 kwh. in 1941 and spent an average of $25 on electric appliances. The company does not merchandise. Dealer sales reached a volume of $400,000. The company's lighting program last year resulted in a 20% increase in commercial and a 10.7% increase in domestic lighting revenues. It is estimated that Christmas sales and out of door lighting for the holidays were 15 to 20% higher than in 1940. No changes are contemplated in the company's merchandising policy. Major competition is natural and bottled gas. In 1941 900 home and 100 commercial evaporative coolers were sold, 10 home and 15 commercial installations involving refrigeration. *W. H. Howe, commercial manager.*

California

Alameda Bureau

A 10% improvement in general business conditions during 1941 was noted in the territory served by the Bureau of Electricity, City of Alameda, Calif. The bureau does no direct selling of appliances but plans to share in dealer

CUSTOMERS AND CONSUMPTION

UTILITY TERRITORY	Residential customers			Average annual kw.-hr. consumption—Residential					Commercial customers		Total all customers
	1940	1941	of which are rural	1941	1940	1939	1938	1937	No. 1941	Ave. ann. consump.	
Alameda, City of	10,913	11,600		1,104	1,080	1,142	971	968	1,120		13,201
Albuquerque G. & E.	14,463	15,550			620	605			2,800		
Anaheim Mun. L. & W. Dept.	3,303	3,350		482	468				900		4,250
Arizona Edison	12,146			722	711	655					
B. C. Elect. Ry., Vancouver	94,312	98,321	16,523	922	909	1,026	1,003	991	16,162	4,611	114,483
B. C. Elect. Ry., Victoria	20,788	21,900	3,980	865	839	801	760		3,700		26,600
Burbank, City of	12,421	15,150				850	828	853	1,300		
Calif.-Elect. Pr.	26,013	26,660	1,460	1,305	1,349	1,376	1,370	1,291	4,350	7,400	36,350
Calif.-Oregon Pr.	27,204	28,825	3,670	2,558	2,385	2,243	2,167	2,100	6,980		39,475
Central Arizona L. & P.	25,800				1,124	1,038	975	910			
Cheyenne L. F. & P.	5,646				930	905					
Coast Counties G. & E.											
Colorado Central P.	6,033	6,327	2,349		780	768			966		9,934
Colorado Springs, City of	12,800			870	834	782					
Colorado Utilities Corp.	1,294				600						
Eastern Ore. L. & P.	6,634	6,750	860	1,164	1,056	919	850		1,801	10,440	8,551
El Paso Electric	25,931	27,700	1,660	1,285	1,279	1,128	1,058	952	4,300	4,147	32,200
Eugene, City of	8,623	9,300		2,700	2,602	2,379			1,400		10,700
Grays Harbor PUD	10,424	10,900	1,750	996	703	652	618		1,950	5,600	13,000
Glendale, City of	25,135	26,400	140		1,032	1,010	971		5,015		31,555
Hawaiian Electric	41,465	44,972	5,936	1,411	1,244	1,123			9,497	4,588	55,469
Idaho Power	57,523	61,600	18,600	2,018	1,946	1,855	1,719	1,577	6,920	6,900	69,500
Imperial Irrigation Dist.	5,469	5,770	3,710	1,500	1,520	1,430			1,820		11,300
Logan, City of	3,824	3,846		1,238		1,994					
Los Angeles B. P. & L.	418,242	439,500		1,000	954	886	838	782	53,500	9,370	537,200
Modesto Irrigation Dist.	3,900	4,265	5,275	1,800	1,773				3,025		12,565
Montana Power	70,000		3,000		920	875	839	815			
Mountain States Power	51,948	55,000	8,425	1,410	1,362	1,286	1,247	1,156	9,300	3,050	68,000
Northwestern Elect.	34,139	36,341	5,000	1,662	1,529	1,423	1,354	1,308	5,578	10,790	42,716
Pacific G. & E.	711,734	742,000	198,999	1,072	1,027	985	945	849	136,000	5,920	968,000
Pacific Power & L.	60,761	61,703	12,740	1,802	1,689	1,606	1,550	1,475	6,738	6,438	73,506
Pasadena, City of	28,160	28,700		1,066	1,023	981	929	887	4,740		33,440
Portland Gen. Elect.	124,959	130,600	43,500	1,698	1,518	1,390	1,317	1,237	14,530	32,000	146,100
Provo, City of	4,155				1,080						
Public Service Co. of Colo.	115,530	120,150	4,950	770	749	700	653	620	18,800	6,040	139,600
Puget Sound P. & L.	179,760	196,500	103,000	1,700	1,511	1,391	1,295	1,236	24,400	11,200	221,800
Raton Pub. Service	1,594	1,608	20	920	891	841			531		2,159
Rawlins Electric	1,352	1,432	15	717	703	655			271		1,718
Riverside, City of	10,511	10,836		1,028	983	768			1,380		12,215
San Diego G. & E.	82,963	93,019	15,188	1,048	994	953	896	835	14,482	6,388	112,615
Seattle, City of	80,150	82,630		2,100	1,703	1,492	1,384	1,268	12,060	10,230	96,000
Sheridan County Electric	3,010	3,000	518	760	747	670			890		4,408
Sierra Pacific Pr.	12,898	13,500	874	1,682	1,591	1,466	1,440	1,354	2,600	10,500	16,300
Southern Calif. Edison	460,724	474,000	27,000	1,000	984	972	945	910	60,000	3,500	582,000
Southern Colo. Pr.	21,051	21,600	1,700	980	932	891	838	741	3,280	3,635	27,900
Southern Nev. Pr.	2,620			1,500	1,200						
Tacoma, City of	33,685	35,369		2,359	2,185	1,961	1,804	1,632	4,031	11,374	40,667
Telluride Power	3,591	3,591	1,745		600	555			627		5,963
Trinidad Elec. T. Ry. & G.	2,901	3,000	600		615	603			587		
Tucson G. E. L. & P.	14,682	15,820	6,565	1,014	987	932	911	876	1,953	13,316	17,775
Turlock Irrigation Dist.	5,533				2,700	2,582					
Utah Power & Light	105,925	109,953	18,208	1,246	1,212	1,140	1,068	1,067	10,294	7,155	122,931
Washington Water Pr.	72,599	74,051	7,073	2,405	2,284	2,060	1,985	1,879	10,092	9,492	85,854

advertising in 1942 as in the past. A total of 13,201 customers is served by the utility.—*G. A. Baxter, secretary.*

Anaheim Light Dept.

Residential customers of the Municipal Light & Water Department, Anaheim, Calif., used an average of 482 kwh. of electricity in 1941. This was stepped up from a 468-kwh. average in 1940. The utility does no appliance merchandising.

Burbank Public Service Dept.

The Public Service Department, City of Burbank, Calif., will continue to give its dealers full cooperation, and plans to carry on local newspaper advertising in 1942. Business in the area tripled during 1941 due to the defense program.

Imperial Irrigation Dist.

Imperial Irrigation District sold 32,605,000 kwh. in 1941, with the average domestic consumption 1500 kwh. per customer. The utility does not merchandise but assumes contingent liability on dealer paper financed through the EHFA and Bank of America.

Since its advertising is largely institutional, the district expects to do about the same amount in 1942 as in 1941, but thinks that dealer advertising is certain to be reduced.

Outdoor Christmas lighting was better than in previous years and the electric load showed a falling off only during the two nights of the blackout, when the decrease was approximately 10% and after the peak period.—*M. J. Dowd, chief engineer and general supt.*

Glendale Public Service Dept.

The City of Glendale, Calif., Public Service Department is no longer merchandising new appliances and will remain in the field as a sales organization only until its present supply of ranges is exhausted. We are also making an effort to limit our service work to repairs only.—*Ward C. Hosier, electric range division.*

1941 ACCOMPLISHMENT

UTILITY TERRITORY	No. of resident customers	Average annual kw.-hr. per resident customer	kw.-hr. increase 1941	Spent for appliances	Average per home $	Ranges Sold		Water Heaters Sold		Refrigerators Sold		Washers Sold		Ironers Sold		IES Lamps Sold		% of total volume sold by dealers
						1941	per 1,000 homes	1941	per 1,000 homes	1941	per 1,000 homes	1941	per 1,000 homes	1941	per 1,000 homes	1941	per 1,000 homes	
Alameda, City of	11,600	1,104	24			130	11.2	5	0.5	250	21.6					350	30.5	100
B. C. Elec. Ry., Vancouver	98,321	922	13	2,275,000	23.10	1,266	129.0	82	0.8	3,148	32.9	2,775	28.2	79	0.8			80
B. C. Elec. Ry., Victoria	21,900	865	26	550,000	27.50	180	8.2	31	1.4	487	22.2	790	36.1	26	1.2			79
Burbank, City of	15,150					600	39.8	90	0.6	2,000	13.2							100
Calif.-Ore. Pr.	32,495	2,558	173		32.90	3,000	92.5	2,350	69.5	3,200	98.5					4,200	129.2	
Colorado Central P.	7,676				12.00	85	11.1	30	3.9	465	60.7					160	20.9	
Eastern Ore. L. & P.	6,750	1,164	108	313,000	47.00	358	53.1	263	39.0	777	115.1	639	94.9	72	10.7	750	111.2	40
El Paso Electric	27,700	1,285	6	800,000	20.00	590	21.3	470	17.0	2,500	90.3	475	17.1	50	1.8	4,250	153.5	
Eugene, City of	9,300	2,700	98			750	80.7	440	47.3									100
Grays Harbor PUD	10,900	996	166	730,000	15.00	492	45.1	528	48.4	1,708	156.3	960	88.1	170	15.6	1,141	104.8	100
Glendale, City of	26,540					550	20.8	17	0.6									60
Hawaiian Electric	44,972	1,411	167			2,000	44.6	1,400	31.2	6,150	13.7	4,400	98.0	170	3.8	5,250	117.0	
Idaho Power	61,600	2,018	72	4,387,979	72.50	5,240	85.1	2,466	40.0	9,393	15.2	6,343	102.8			6,942	113.0	80
Imperial Irrigation Dist.	9,480	1,500	—20		100.00	100	10.5	75	7.9	300	31.6							100
Los Angeles B. P. & L.	439,500	1,000	46			3,819	8.7	1,333	3.3									100
Modesto Irrigation Dist.	9,540	1,800	27			165	16.4	63	6.7	550	57.6					48	5.0	50
Mountain States Power	55,000	1,410	48			2,005	36.4	1,036	18.7	6,028	111.0	3,754	68.2	401	7.3	3,053	55.4	100
Northwestern Elect.	36,341	1,662	133	2,870,500	79.00	3,294	90.5	1,566	43.0	6,490	172.0	4,029	111.0			8,838	244.0	
Pacific G. & E.	742,000	1,072	45	32,000,000	43.00	7,850	10.6	4,000	0.5	90,000	121.3	57,800	77.8	12,000	16.2			
Pacific Power & L.	61,703	1,802	113	4,979,847	80.50	3,556	52.6	2,152	34.9	10,481	170.1	7,096	115.1	737	11.9	17,526	287.0	92.7
Pasadena, City of	28,700	1,066	43			225	7.8	95	0.3	2,150	74.7							100
Portland Gen. Elect.	130,600	1,698	180	8,500,000	45.00	8,989	68.6	3,957	30.5	12,000	88.4	8,500	65.2	1,000	7.8	17,000	130.7	
Public Service Co. of Colo.	120,150	770	21	1,156,000*		670*	5.6*	190*	1.6*	2,380*	19.1*	950*	7.9*	600*	5.0*	7,350*	6.3*	
Puget Sound P. & L.	196,500	1,700	189	8,390,750	42.70	13,300	67.8	9,650	49.1	33,400	170.5					20,000	102.0	90
Raton Public Service	1,608	920	29			48	30.0	28	17.4	67	42.0							
Rawlins Electric	1,447			9,500		15	10.3	1	0.9	215	148.2					300	20.7	
Riverside, City of	10,836					150	13.9	44	4.1									100
San Diego G. & E.	93,000	1,048	54	4,500,000		700	7.5	500	5.3	11,750	126.2	6,850	73.6	1,100	11.7	3,600*	38.7*	60
Seattle, City of	82,630	2,100	397			7,732	93.7	4,296	51.9	800*	9.7*							50
Sierra Pac. Pr.	13,500	1,682	91	850,000	60.00	1,252	93.6	355	26.4	1,769	130.0							100
Southern Calif. Edison	474,000	1,000	16	16,500,000	35.00	5,400	11.4	1,700	3.6	43,847	92.5	34,534	72.8	5,682	12.0			
Southern Colo. Pr.	21,600	950	48	909,000	43.00	639	29.6	268	12.3	2,442	113.3	1,904	52.5	159	7.4	1,208	55.9	83
Tacoma, City of	35,369	2,359	174	500,000	25.00	1,850	52.4	1,600	45.4									
Telluride Power	5,336					124	23.3	5	0.9	225	41.9					200	37.5	
Trinidad Elec. T. Ry. & G.	3,000					50	16.6	2	0.7	353	118.0					80	26.6	
Tucson G. E. L. & P.	15,820	1,026	39	400,000	25.00	175	11.1	50	3.2	1,500	95.0	800	50.5	25	1.6	1,000	63.4	100
Utah Power & Lt.	109,953	1,246	34	8,183,527	74.43	6,075	55.7	1,105	10.1	17,196	151.5	11,645	105.9	938	8.6	17,796	162.3	98.3
Washington Water Pr.	74,051	2,405	121	5,043,004	68.10	5,788	79.3	4,023	54.0	13,482	181.9	7,522	101.7			15,350	207.0	80

*Report covers company sales only.

California Electric Power

Conditions in the territory served by California Electric Power Co. were neither better nor worse in 1941 and the company will continue to merchandise as long as there is merchandise to sell. Electric range sales were up slightly, water heaters and refrigerators showed a slight decrease. Ironers and air heaters sold better, and ironers particularly attained a ratio of one to every three washers. There is a 26% saturation of electric ranges, 15% of water heaters, 65% refrigerators, 60% washers. About 10% of the ranges sold were replacements, 5% water heaters, 15% refrigerators, 50% washers.

Air conditioning and evaporative coolers continued to sell. The company reports 200 commercial, 700 residential evaporative cooler installations, and 15 jobs involving refrigeration in commercial and 18 in residences.

Participation in the National Orange show at San Bernardino, the West Riverside Harvest Festival, the Imperial and Riverside county fairs, and Hemet Turkey show were featured events. Natural gas and butane were competing fuels. Possible shortage of butane faces its customers, however.

The company hopes to maintain its regular sales staff and keep its advertising program, talking direct sales messages as long as merchandise lasts, turning to institutional in case of shortages.

Los Angeles Bureau of P & L

New business and promotional activities of the Bureau of Power & Light, Los Angeles, will be guided by trends in the national emergency. The bureau plans for the present to continue its active cooperation and coordination with dealers, distributors and manufacturers through advertising, sales assistance in the field and effective reimbursement of wiring expense so that major electric appliances may be competitive in installed cost with those using other fuels. The figure for refrigerator saturation in 1941 was based on national saturation.

Competition is natural gas and, in some cases, oil.

Approximately 5500 kw. was added to the bureau's lines as a result of a commercial lighting campaign to which three lighting specialists devoted full time. The present emergency is expected to bring a larger market for commercial lighting due to activities in defense plants. Domestic lighting loads probably will be up due to the defense housing program.

It is estimated that load increase from commercial cooking promotion in 1941 was 1560 kw., with approximately 300 installations. The bureau cooperated with dealers in promoting sales, engaged in direct mail advertising and advertised in restaurant publications. One specialist worked full time on this activity and the balance of the sales force put in from 5% to 10% of its time. The bureau made wiring reimbursements up to $4 per kw.

The bureau does no merchandising and its regular sales force is engaged entirely in promotional work.—*Charles C. Snyder, business agent.*

Modesto Irrigation Dist.

The Modesto Irrigation District plans to continue its newspaper advertising and daily radio broadcast in 1942 but looks for a reduction in dealer advertising. Other effects expected from the present situation are reduced dealer sales staffs and increased service work. Business generally in the territory was up from 25% to 40% in 1941.

Pacific Gas and Electric

Quotas set up by Pacific Gas and Electric Co. for 1942 are based on estimates of the volume of appliances available. Durable consumer goods for civilian use will become increasingly scarce as the months roll on this year. In fact, for most products using critical metals, except perhaps for lamps, we might expect our supply ultimately to dry up just as it has in the the automobile business. Notwithstanding this, in view of the heavy inventories carried in our territory on most home appliances and the quantities manufacturers will be permitted to manufacture during the first few months, together with what they undoubtedly will be allowed to continue to build during the second quarter of the year, we feel that our estimates for 1942 will go through pretty much as we have contemplated.

Our operations in 1942 will be somewhat streamlined. In general our policy will conform to a program geared to "all out" defense. This means the elimination of merchandise campaigns having customer inducements and certain types of action-stimulating features. In every other way at our command, however, we will do everything possible to maintain and increase our domestic load. We expect to concentrate our effort on existing homes where new supply facilities may not be involved or, if so, only on a moderate scale.

One of our principal concerns this year—even more so than in the past—will be to continue and extend our cooperative plan of action with dealers in order that they may successfully meet the problems which will confront them. Certain markets will have access to priority consideration and these, of course, will be promoted with dealers to help them through a difficult period. In this category I have in mind the farm market which will be engaged on a *Food For Defense* program, qualifying for special priority consideration and, in a very large portion of our territory of service, the defense housing areas, which definitely will qualify for priorities under the present ruling.

It is clear that strictly civilian demands for equipment and appliances must give way to the more urgent needs connected with our country's production facilities in this emergency and this situation in itself calls for real sales effort. It is not the kind of effort we have been accustomed to, that is true, but it is none the less important customer contact work. These customers must be properly informed and there are many other important functions to perform for them with respect to service and utilization of their present equipment.

We go into 1942 with a selective selling program, giving major emphasis to all business connected with defense, but preserving intact the greater portion of our veteran sales force to protect the important domestic business against the time when large power loads incidental to defense may be curtailed or eliminated.

There has been a decrease in number of dealers in the territory as a result of the present situation, with appliance dealers most affected. Dealer advertising has been decreased in volume. Credit restrictions have not affected dealer sales volumes seriously.

No appreciable increase in dealer service departments has been noted as yet. We have a comprehensive program on the rehabilitation of major electric equipment and plans are under way to develop a dealer program on other types of equipment.

The company's advertising policy will be general coverage on utilization of appliances; but no "action compelling" copy and no cooperative advertising will be run.

Largest sales results in company history were secured from the Electric Range and Water Heater campaign in 1941, based on special customer inducement and cooperative advertising with dealers. Agriculture and electric cooking and adequate living were featured at the California State fair.

Home service activity was doubled in 1941. The company employs 20 home service girls.

The Electric Appliance society promotes cooperative campaigns in the sale of electric appliances. The company offers group training for dealer salesmen by appliance counselors.

General business conditions in the territory were good the first nine months of 1941 but fell off during the last quarter. Major competition to electricity is from butane, wood and oil.

The company's lighting program last year resulted in higher levels of lighting in commercial and industrial classifications. Results in the domestic field were about on a par with 1940. The company plans to increase its effort on industrial lighting during the present emergency. Domestic lighting probably will be curtailed slightly due to shortage of supplies. Commercial cooking in 1941 took the form of cooperative activity with equipment dealers. Counter and pantry appliances were featured. Five salesmen were engaged in this work and 772 installations were made for a load increase of 5,198 kw.—*O. R. Doerr, general sales manager.*

Pasadena Light Dept.

The City of Pasadena, Calif., Light & Power Department does no merchandising of appliances. The utility plans to do "good will" advertising as in the past and will offer "at cost" service on appliances brought to its shop.—*B. F. DeLanty, general manager.*

Riverside Lighting Dept.

The City of Riverside Lighting Department reports an average kwh. consumption for its residential customers of 1028 in 1941. The department is doing all it can to encourage reconditioning of old appliances but the work is limited due to trouble in getting materials.—*C. G. Dahlgren.*

San Diego Gas & Electric

We believe our main job for 1942 will be the turning of our sales forces to a customer service activity in which salesmen and dealers will continue to sell available appliances to customers who need them and to retain customer interest in savings through operation of their electric appliances and through keeping them in first class operating condition.

We can not determine at this time our overall sales policy. However, we do believe that we can continue our educational campaign for better home lighting and improved commercial lighting, even though we may not have many domestic appliances available.

Although we at first lost considerable load following December 7, the tendency was for some of this load to return to normal in succeeding weeks, particularly just before Christmas. Many increments of load have been lost, probably for the duration, such as sign lighting, isolated street lighting, small commercial establishments and, to some extent, residential customers. At the same time military activity and defense plants have increased their use of electricity. It is very difficult to estimate the net loss of these changes on sales and particularly on revenues.

Commercial lighting showed an increase of more than 100% over 1940 as a result of San Diego Gas & Electric Co.'s 1941 program. A domestic rate reduction totalling $78,545 was put into effect March 17. The company does not foresee further rate changes immediately unless further reductions are made based on the present high level of revenues and without due consideration for lagging increase in operating costs and fixed charges. Major competition is gas.

Residential customers served by the company increased from 82,963 at the end of 1940 to approximately 93,000 in December 1941. Three Government housing projects completed during the year provide accommodations for 4200 families.

The Bureau of Radio and Electrical Appliances of San Diego county promotes appliance sales in the territory. Outstanding sales events in 1941 were the Fifth Annual Spring Fair in April and the Ninth Annual Electrical Show in November.

Six of the commercial and one of the industrial air conditioning installations made during the year involved refrigeration.—*A. E. Holloway, vice-president in charge of sales.*

So. Calif. Edison

Many things have happened since "Black Sunday", December 7, both in the sales outlook and in the attitude of people in general toward buying things. The discontinuance of the manufacture of automobiles has had the most profound effect, as it brings home to the people that we are actually at war in a dramatic manner that could only be equalled by an actual bombing. Undoubtedly it was intended to have that effect, at least in part.

Final sales and consumption figures were close to our estimates but we have rather drastically changed our viewpoint regarding the opportunities for 1942. Our tentative estimate is about 40% of 1941 accomplishment but this may be reduced again, depending upon governmental restrictions, rationing, priorities, and so forth.

There seems to be plenty of merchandise available at the present time, however, and I think rather substantial stocks are on hand. As soon as people get over the first shock, buying may pick up considerably. We are situated in a defense area where there is a tremendous amount of activity, large pay rolls and considerable building and so we can expect above-the-average sales opportunities in Southern California.

During 1941, Southern California Edison had productive exhibits at the Ventura, Tulare and Los Angeles County fairs and other special showings. The company participated in many newspaper cooking schools.

Gas furnishes the main competition to electricity in the area. Results of the company's lighting program last year were very good and commercial cooking promotion netted a load increase of 6000 hp. Counter equipment was featured in commercial cooking sales activity.

Air conditioning installations added 1500 hp. in the commercial classification. A total of 1721 evaporative coolers was installed in homes in the territory.—*H. C. Rice, manager domestic sales.*

Away back when cars looked and acted like this 1902 model, the Colorado Central Power Co. of Golden, Colo., reminded its customers in parades, the cost of electricity was high also. Similar contrast ideas were used in window displays

Colorado

City of Colo. Springs

Average annual kwh. consumption per residential customer served by the City of Colorado Springs in 1941 was 870. This is an increase of 36 kwh. as compared with 1940.

Colorado Central Power

No change in its dealer cooperative plan is contemplated by the Colorado Central Power Co., Golden, Colo. The company does not merchandise appliances. For the present emergency, it is expected that dealer advertising will be curtailed and credit policies tightened due to lack of stock. Service departments probably will be enlarged, since there will be a tendency to use equipment longer due to increased prices and shortage of stocks. Fewer salesmen will be employed. The company is curtailing some of its advertising. Colorado Central serves approximately 9934 customers, all classes. General business conditions in the territory were very much better in 1941 than in 1940.

Public Service Co. of Colo.

Public Service Co. of Colorado is working with other dealers on plans sufficiently flexible to meet developments during the present emergency. A careful study of the situation is being made to keep company salesmen informed and to broaden lines where necessary and curtail when essential. Reconditioning of old appliances as a defense measure has been suggested by advertisement and brought to the attention of servicemen.

The company will endeavor to maintain its present sales staff and plans to expand its advertising policy, particularly radio. It has approximately 139,600 customers, excluding industrial, public authorities and wholesale accounts, and last year sold about $1,156,000 worth of electric appliances.

The Rocky Mountain Electric league promotes the sale of electric appliances, better lighting and adequate wiring in the territory.

A domestic rate reduction was put into effect in 1941 in 27 urban communities and in certain rural areas. General business conditions in 1941 were good in metropolitan centers favored with national defense orders but were sluggish elsewhere.

Coal and natural gas are the major competing fuels and supplies of these are believed adequate but rising prices are likely.

As a result of the company's lighting program in 1941, 1600 incandescent and fluorescent fixtures; 65 floodlights

A Defense Suggestion
FIX UP
some of those old electrical appliances!
CONSERVE LABOR AND MATERIALS FOR DEFENSE
THERE IS PLENTY OF ELECTRIC POWER
Note:
Public Service Company of Colorado

An appeal to fix up old electrical appliances was started by Frank R. Jamison for Public Service Co. of Colorado as early as last October and was effective

and 60 street lighting units were sold. Domestic lighting sales dropped 17%. Although heavy local stocks and substitutes in commercial lighting equipment are expected to last several months, shortages are contemplated.

Air conditioning installations made during 1941 include two home, one industrial and 15 commercial evaporative coolers. Four of the commercial installations involved refrigeration.

Outstanding in 1941 was the R. M. E. L. convention, stressing preparation for defense and the part utilities and dealers should take in the program.—*W. D. Virtue, assistant secretary.*

Southern Colorado Power

Although the electrical appliance business has been and will be further affected by present conditions, we believe our job is to keep on promoting the use of electricity. Obviously we already have changed from a seller's to a buyer's market and, certainly, we have a real selling job to do. We believe this will mean a return to the selling of fundamentals. On refrigerators, we must tell the food preservation story; on ranges, it will be vitamins plus economy, cleanliness and so forth. Certainly if we as an industry carry on this type of promotion, we probably shall be subjected to less restriction on our merchandise than if we pursue some other course.

Our advertising will be designed to aid this program. We are making a particular appeal to our farm customers on the additional use of electricity to offset the scarcity of farm labor. Since the farmer is being asked to produce more food, we believe such a promotion is timely and patriotic.

We are attempting to keep as well informed as possible on conditions that may affect our business and have attempted to place ourselves in such a position that we may be able to alter plans very quickly to meet changing conditions.

Certainly the dealer must be given every assistance in helping him to solve his problems and to assist in keeping his morale as high as possible. Most of us have a definite investment in the dealer and we don't want to lose him now. In other words, we *must* continue some kind of general promotional effort, both for dealers and for ourselves.

It is our opinion that, if we keep alert to our problems, devoid ourselves of negative thinking and approach this situation with self confidence and enthusiasm, we will see it through to a satisfactory conclusion.

Naturally general business in this area was affected by the declaration of war and Christmas buying was reduced. However, although December volume was less than for the same period of 1940, it still was slightly in excess of 1939. We conducted an outdoor Christmas lighting contest again this year, with about the same results as in previous years.

Sixteen home and 42 commercial evaporative coolers were installed during the year. Lighting showed satisfactory progress.—*G. W. Milliken, vice-president in charge of sales.*

Trinidad Electric

Dealer advertising has been cut from 30% to 50% in the territory served by the Trinidad Electric Transmission Railway & Gas Co. Some dealers are going on a cash basis. The company is making no changes in its merchandising plans for the present, and no change is contemplated in the advertising policy. Reconditioning of old appliances is being turned over to dealers. General business conditions in 1941 showed a slight increase over 1940.

Idaho

Idaho Power

A merchandising program which will give full aid to national defense is planned by Idaho Power Co. for 1942. The company will encourage reconditioning of old appliances through individual customer contacts, group meetings and advertising. Sales quotas for 1942 were estimated on the basis of approximately 50% of 1941 sales except in the case of IES lamps.

It is expected that Idaho Power will reduce its sales staff about 25% and that the main job of company salesmen

UTILITY AND DEALER APPLIANCE SALES

UTILITY TERRITORY	Total $ vol. co.-dlr. sales 1941	RANGES					WATER HEATERS					REFRIGERATORS					WASHERS				
		1940 co.-dlr. sales	1941 co.-dlr. sales	1942 co.-dlr. quota	% repl. 1941	% sat. 1941	1940 co.-dlr. sales	1941 co.-dlr. sales	1942 co.-dlr. quota	% repl. 1941	% sat. 1941	1940 co.-dlr. sales	1941 co.-dlr. sales	1942 co.-dlr. quota	% repl. 1941	% sat. 1941	1940 co.-dlr. sales	1941 co.-dlr. sales	1942 co.-dlr. quota	% repl. 1941	% sat. 1941
B. C. Elect. Ry., Vancouver	2,275,000	1,102	1,266		25	14	89	82		10	3	3,209	3,148		5	18	3,406	2,775		60	50
B. C. Elect. Ry., Victoria	550,000	163	180	242	20	15	25	32	40			455	487	600	7.2		620	790	900		
Central Arizona L. & P.																					
Eastern Ore. L. & P.	313,000	253	358	200	10	37	164	263	150		13	761	777	350	20	77	658	639	250	30	95
El Paso Electric	800,000	335	590		2.5	19.5	385	470		.5	13.5	1,950	2,500		9	67	310	475		5	21
Grays Harbor PUD	730,000	212	402	400	2	15	166	528	500		5	773	1,708	1,000	3	50		960	500	10	75
Hawaiian Electric		1,409	2,000	2,200	20	22	985	1,400	1,600	1	11	4,266	6,150	6,700	33	78	3,063	4,400	5,500	45	52
Idaho Power	4,387,979	3,896	5,273	3,000	40	56	1,607	2,495	1,200	10	26	8,557	9,378	5,000	15	55	5,811	6,436	3,000	40	75
Los Angeles B. P. & L.		3,590	3,819		4	6.1	3,100	1,333		3	2.6					65					
Mountain States Power		1,761	2,005			27	659	1,036			7	5,846	6,028			55	4,278	3,754			
Northwestern Elect.	2,870,500	2,634	3,294	1,810	25	41.6	1,139	1,566	860	10	9.7	5,072	6,490	3,570	15	54.8	3,332	4,009	2,220	30	69.6
Pacific G. & E.	32,000,000	5,667	7,850	4,710	15	9.6	3,341	4,000	1,800	10	5.7	77,536	90,000	45,000	25	58.4	43,972	57,800	28,900	30	63.4
Pacific Power & L.	4,879,847	2,637	3,556	1,402	30		1,588	2,152	757	5		9,093	10,481	4,147	20		6,817	7,096	2,901	40	
Portland Gen. Elect.	8,500,000	6,543	8,989	13,500	30	30	2,922	3,957	5,500	4	12.5	11,200	12,000	13,000	22	59	8,175	8,500	9,000	38	64
Public Service Co. of Colo.	1,156,000*	646*	600*	650*	5	6.5	119*	190*	175*			2,763*	2,380*	2,200*	12	55	805*	950*	900*	30	65
Puget Sound P. & L.	8,390,750	9,316	13,300	8,760	41.6	35	4,631	9,650	6,680	19.3	17.4	22,716	33,400	15,180	4.7	59.6					
San Diego G. & E.	4,500,000	600	700				525	500				10,700	11,750				5,875	6,850			
Seattle, City of		5,187	7,732	7,000	30	55	3,013	4,296	5,000	30	31	704*	800*			50					
Sierra Pac. Pr.	850,000	1,091	1,252	1,315	23.6	62	295	356	365	2.5	19	1,748	1,769	1,890	13.6	84					
Southern Calif. Edison	16,500,000	4,694	5,400		20	8.5	1,532	1,700		15	4	43,897	43,749		20	60	29,297	34,534			50
Southern Colo. Pr.	900,000	560	639	445	15	22	243	266	160	2	6	2,370	2,442	1,940	20	50	1,924	1,904	1,900	30	75
Tacoma, City of	500,000	1,640	1,850	2,500	37	40	1,333	1,600	2,000	45	20										
Tuscon G. E. L. & P.	400,000	150	175	175		8.1	50	50	75		2.4	1,500	1,500	1,500		70	700	800	700		42
Utah Power & Light	8,183,527	3,958	6,075	2,800	30	43	810	1,105	500	5	7	13,919	17,196	7,000	30	80	9,541	11,645	6,000	75	87
Washington Water Pr.	5,043,004	4,125	5,788	1,620	20	32	3,257	4,023	805	20	29	9,980	13,482	4,988	30	60	6,355	7,522	2,257	50	50

*Report covers company sales only.

UTILITY TERRITORY	IRONERS					CLEANERS					RADIOS					AIR HEATERS					IES LAMPS				
	1940 co.-dlr. sales	1941 co.-dlr. sales	1942 co.-dlr. quota	% repl. 1941	% sat. 1941	1940 co.-dlr. sales	1941 co.-dlr. sales	1942 co.-dlr. quota	% repl. 1941	% sat. 1941	1940 co.-dlr. sales	1941 co.-dlr. sales	1942 co.-dlr. quota	% repl. 1941	% sat. 1941	1940 co.-dlr. sales	1941 co.-dlr. sales	1942 co.-dlr. quota	% repl. 1941	% sat. 1941	1940 co.-dlr. sales	1941 co.-dlr. sales	1942 co.-dlr. quota	% repl. 1941	% sat. 1941
B. C. Elect. Ry., Vancouver	86	79		2	2.7	807	649		55	65	12,765	9,720		80	85	507	415								
B. C. Elect. Ry., Victoria	10	26	30			221	262	350			3,030	3,700	4,500			115	146	200							
Central Arizona L. & P.																									
Eastern Ore. L. & P.	79	72	50		9	265	232	150	25	75	1,090	1,050	500	50	96	48	79	30		5	728	750	500		60
El Paso Electric	32	50		.5	1	490	550		3	42	1,600	2,150		30	97	130	175		5	20	3,600	4,250		1	48
Grays Harbor PUD		170	100		5		401	400	10	50		2,418	1,000	25	90		4	50				1,141	500		35
Hawaiian Electric	107	170	200	1		1,091	1,420	1,500	5	21											4,625	5,250	5,000	1	18
Idaho Power						1,564	2,207	1,100	40	65	12,628	11,870	7,000	70	90						6,977	7,909	7,500	30	60
Mountain States Power	363	401			10	780	482				8,003	5,994					225				3,433	3,053			
Northwestern Elect.					9.7	2,639	2,697	1,480	50	67.2	11,595	9,727	5,350	25	107.2					9.4	9,095	8,838	4,860	20	35.3
Pacific G. & E.	8,021	12,000	6,000		10.2	34,382	35,000	17,500	60	58	172,504	183,000	137,250	90	94.2	7,401	5,500	2,800	50						
Pacific Power & L.	567	737	188	1		2,948	2,843	883	40		16,137	16,916	6,006	65							17,512	17,526	13,057	10	
Portland Gen. Elect.	800	1,000	1,500		24.5	6,400	7,000	7,500	50	66	20,000	22,000	24,000	50	105	1,250	1,500	1,750			16,500	17,000	17,500		59
Public Service Co. of Colo.	443*	600*	500*		8	1,466*	1,600*	1,400*	80	70	1,201*	1,100*	1,000*	80	85	189*	180*	170*		15	9,575*	7,350*	7,000*		40
Puget Sound P. & L.																					20,581	20,000			
San Diego G. & E.	985	1,100				3,485	4,500				16,600	20,000				2,300	2,400				6,911*	3,600*			
Sierra Pac. Pr.																93	60	50							
Southern Calif. Edison	3,848	5,682			4.5	11,314	12,900				72,414	73,988				1,484	1,782								
Southern Colo. Pr.	140	155	125		5	524	500	530	60	75	4,300	4,138	3,500	75	95	115	130	95	5	20	2,344	1,208	1,700		40
Tuscon G. E. L. & P.	25	25	25		1.3	600	700	600		35.5	2,000	2,000	2,000		99.4	200	200	200		8.9	1,000	1,000	1,000		37
Utah Power & Light	792	938	498	75	3	5,699	7,245	3,500	75	85	19,070	22,748	12,000	75	100	842	991	383	75	7.5	16,623	17,796	10,000	30	71
Washington Water Pr.				10	60	2,599	3,159	948	50	70	19,264	19,046	5,714	50	90				10	10	15,383	15,350	3,837	30	30

*Report covers company sales only.

will be to maintain customer contacts. Home service girls will give more group presentations and will aid national defense. Advertising will show how electricity in the home and on the farm aids the defense program.

A 5% cut in domestic rates was made in 1941. Business conditions generally in the territory were better than in any year since 1930.

Appliance sales in the area are promoted by the Electrical Equipment Sales association. Major competing fuels are coal and wood.

Electricity for commercial cooking was pushed through schools, direct mail and individual contacts, with nine salesmen working on the accounts. Counter equipment and small commercial ranges were featured.

The company endeavored to help train dealer salesmen in 1941 through training classes conducted by supervisors and home service personnel.—*E. A. Olson, residential and farm sales manager.*

Into log cabins like this, tent homes and even into caves occupied by coal miners, Montana Power extended the benefits of electricity in its commercial programs last year. Ranges, roasters, IES lamps brought comforts even to the very poor in the area

Montana

Montana Power

Although Montana is a long way from Manila neither has been heard from for some time. Sometime in midyear drastic curtailment of commercial activity and sales promotion were reported to be in the making by "refugees" from that region of the West. A fall light conditioning program for dealers was launched and the new policy of turning all merchandising over to dealers announced to dealers at that time.

Up to June sales records were being shattered in all directions. Coincident with a $339,000 electric rate reduction announced in May an all-industry campaign was launched to recapture by increased use this reduction in revenue. By Aug. 25 every one of the company's 88,000 residential, commercial and small industrial customers was to be called upon to explain the new rates and to urge increased usage. A great many prospects for dealers were uncovered in that contact drive. Display material, advertising support, radio and billboard advertising were announced for a "Better Living" campaign.

An estimated market of $3,796,000 for new appliances was created by this rate reduction, and quotas of dealer and company sales were set up. There were to be sold: 97,982 cartons of lamp bulbs, 16,628 portable lamps, 27,078 other lighting units, 181 home ventilating systems, 31 air conditioning units, 10,047 refrigerators, 2,907 ranges, 750 water heaters, 16,423 radios, 18,081 table cookery appliances, 12,557 other heating devices, 3,086 vacuum cleaners, 7,054 washers, 2,758 fans, 1,933 farm devices, and 3,525 other motor devices.

In the June report of company and dealer sales the following had been sold: 1,077 ranges, 3,802 refrigerators, 135 water heaters, 6,438 radios, 2,764 washers, 410 ironers, 1,047 cleaners, 4,926 portable lamps, 156 heating plants, 54 portable ranges, 193 roasters, 875 hotplates, 3,368 table cooking devices, 3,470 other heating devices and 519 farm devices. Of this the company had only sold 437 of the ranges, 1,641 portable lamps and a minor number of other appliances, the dealers making virtually all sales. The figures were all substantially in excess of the 1940 figures for the same period.

Then came some kind of a "blitz" and like Manila, no word has been heard from it since. The sales staff and home service personnel were reduced, it is reported. Manufacturers and wholesalers report that dealer sales volume continued high up to the time of restrictions on terms as in other territories.

Nevada

Sierra Pacific Power

We are of the opinion that one guess is as good as another in regard to sales estimates for 1942. Our dealers are reasonably well stocked for at least the first quarter, but beyond this period the future is hazy. We estimate that about 25% of our appliance quotas will be available for sale.

The Reno Plan has been operating for nearly 10 years, with practically no change in fundamental policy; and we contemplate no revision of program at the present time, unless we are forced to do so. This plan was originally designed to be depression and emergency proof from the company's standpoint and we have found it to be the direct answer to many of the problems which are confronting the various sales organizations of the industry.

When we discontinued direct merchandising in 1932 and passed the job along to the dealers, we saw to it that our company would never be burdened with the difficulties of maintaining merchandise stock and the many personnel problems of a sales organization. Since that time there has not been a sales employee on the company pay roll and in the event electrical equipment is not available for sale, our New Business department will continue to function in a normal manner, rendering its services to our customers and dealers. Because we don't merchandise, we will not have to face the possibility of our customers flocking in to explain why they cannot make the monthly installment on range or refrigerator when the war effort really begins to drain incomes. From the public relations angle, this in itself is invaluable.

Our basic policy has been to make the dealer happy and prosperous. We trust we shall be permitted to carry on our cooperation with them. The Plan is flexible and we can revise it at will. As conditions change from time to time, this is our "ace in the hole"—to adapt our methods, as much as possible, to maintain the healthy cooperation of our dealers and foster the good will and tolerance of our customers.

December sales were about the same as in 1940.

Our lighting program in 1941 continued to be successful through the cooperation of contractors, dealers, architects and others; but the present emergency unquestionably will affect our plans for 1942. As we are not classed a defense area, the situation may seriously affect this territory.

An outstanding sales event in 1941 was a Better Housing exhibit held in the State auditorium for five days. All electric dealers as well as builders, contractors, lumber dealers and others participated. The Nevada State Journal Cooking school was staged at the Granada theatre for three days and a two-day cooking school was held by H. E. Saviers at the Tower theatre. A large number of smaller cooking schools were held by dealers in outlying districts—*A. L. Pierce, new business dept.*

Southern Nev. Power

Southern Nevada Power Co., Las Vegas, Nevada, reports that residential customers in the territory used an average of approximately 1500 kwh. in 1941 as compared with 1200 kwh. in 1940.

New Mexico

Albuquerque

Conditions were improved in 1941 in the territory served by the Albuquerque Gas & Electric Co. No changes have been made to date in the company's merchandising plans and dealer set up. The present emergency is expected to slow down dealer activities. The company plans to continue its advertising on the same basis as in the past.

Raton Public Service

Raton Public Service Co., Raton, New Mexico, reports that its business increased in 1941, but that local merchants noted a drop in volume. The company plans to maintain its advertising policy and believes that dealer advertising, credit policies and size of dealer staffs will depend upon the availability of electric equipment. The company serves 2,159 customers in an urban territory. Major industries are railroad shops, a packing plant and a flour mill.

Oregon

California Oregon Power

Sales slumped when war was declared, particularly in electrical equipment although the small appliance business was fair. Outdoor lighting for Christmas was practically nil. Dealer morale was not good due to the slowdown in Christmas sales, particularly heavier devices, and the threat of acute shortage of electrical equipment for retail in 1942.

Our load, so far as we can tell, was not affected materially. However, this will not be evident until after the January meter readings have been tabulated. Blackouts, and particularly the elimination of a great many signs and window lighting installations naturally will affect our load. How much we cannot tell yet.

Since Jan. 1, retail sales have been slightly better. For the first seven months of 1941, general business conditions were 20% above 1940, but business decreased gradually following Aug. 1.

The company is reducing its sales force during the emergency. We will continue to push lighting and major items as long as they are available. It is expected that dealer advertising will be reduced; our advertising policy will be about the same as in the past. The company has accumulated a stock of parts and will begin advertising rehabilitation of old equipment.—*Glenn L. Jackson, vice-president.*

Eastern Oregon L & P

Eastern Oregon Light & Power Co. discontinued merchandising of appliances and free wiring on ranges and water heaters as of January 1, 1942. Company sales for 1941 amounted to $93,546, an increase of $19,069 over 1940 achievement.

The company made a 12% reduction in domestic rates during 1941. Coal is the major competing fuel.

Free wiring and tie-in advertising were methods of assisting dealers in 1941. Nothing is being done at the present time to encourage reconditioning of old appliances.

The commercial customer and kwh. figures listed by the company include industrial accounts. Twenty commercial evaporative coolers were sold during the year, two involving refrigeration.—*Leon G. Gray, division manager.*

Eugene Water Board

The Eugene Water Board, City of Eugene, will cooperate in national defense by limiting its requirements for new equipment. The utility does no merchandising and employs no salesmen. Advertising is confined to certain newspapers as a supplement to dealer advertisements. No changes in credit policies or in the service department are contemplated.

Mountain States Power Co.

"What has happened to sales?" I think we should go back beyond Dec. 7 to the period when restricted financing began and the start of the general tightening up of time buying and at the same time the early publicity and general discussion among everyone in all walks of life relative to the high tax situation, the substantial burden this was to place on every individual, etc., and say that business since Oct. 20, 1941, dropped, as near as I can tell, at least 75% from that period on.

A general survey among dealers, however, reveals that within the past 60 days most of them have readjusted themselves. Though sales may be smaller and business limited, I believe I can safely say that at least 99% of them are still in business. They seem to feel that business will be limited, but that by cutting their overhead they can stay in business for a considerable period if not for the duration.

As to advertising, in our particular business we have cut it by approximately 25%. This may seem a very substantial cut, and it is, but on the other hand we were carrying a rather substantial program. Very little advertising is being done by appliance dealers. One sees an occasional small ad, in most cases not on electrical apparatus.

Our load was holding up quite well until Jan. 7 when we had a most disastrous ice storm, the worst the Northwest has seen, at least for this part of the country. Even though we had anticipated rather substantial cuts due to the blackouts and the general recess in business, actually these appear as small by comparison. Possibly we lost some business in lighting load but from all indications these blackouts apparently caused people to stay home where they used more light, radio, etc.

But 95% of our system in Oregon was blacked out and we had hardly a line left standing intact because of the ice storm.

Christmas sales of appliances, as near as I can tell, were about 50% of what they were a year ago. In some of our properties east of the mountains, outdoor lighting for Christmas was a reality and carried on in the usual manner. However, Christmas lighting in our Oregon properties was for the most part missing. One could see an occasional display in front of someone's home but blackout restrictions prevented Christmas street decorative lighting except for a few days.

Two of last year's campaigns were very successful. The first, one on electric ranges, ran from April 15 to June 15. From Oct. 1 to Dec. 1 we conducted something new in the way of a lamp bulb campaign. "Make the thrifty change to an electric range" was the catchy slogan around which dealers were helped to sell more ranges.

In addition to advertising and promotional helps, and assistance given by our salesmen to dealers, we followed the prospects who already owned an electric range and would not replace with a new range by offering to modernize the range with new surface units and parts through an attractive purchase basis.

The lamp bulb campaign was advertised "to stop bulb snatching" and offered free one 150-watt lamp with the purchase of six other lamp bulbs of 60 watts and over. Coupons on ads and distributed to customers offered the free 150-watt lamp when purchases were made at dealers stores. In the Wyoming division alone 7,500 lamps were sold. 1,200 of the 150-watt lamps given away. Each one was worth it in load.

Evaporative coolers made a beginning in some parts of the system, with 195 commercial and 25 home units installed.—*H. E. Farris, manager new business and sales.*

Northwestern Electric

Any sales program for 1942 that is not seriously touched with the present emergency and the national defense program would not be patriotic, and would in fact be unjust to its own cause, that of private initiative and free enterprise. This is particularly true in the electrical industry since its very existence may depend upon complete cooperation with the national defense of the country. Sales expense and sales personnel have been trimmed to the bone for the duration. Our approach to 1942 in expected business has been greatly pared, and we hope it does not suffer further curtailment. But we are in a war, and our resources and activities must be ready for changes as circumstances dictate from day to day.

Let us take a look at the market for 1942 and some of the restrictions that will hinder normal growth. Among these we find:

Limited supply of electrical appliances
Regulation of credit or term payments
Increase in prices through lower production
Additional costs for sur-tax charges
Raw material substitutions causing a buying hesitancy

While "stop lights" will probably be more frequently than "go lights" with further curtailments in the offing, there are favorable assets on the other side of the ledger that will serve us in the next twelve months, such as:

Scarcity of appliances, which sharpens customers' desire to buy things now in fear of not being able to get them at all later. Such a situation also presents the problem of *satisfying customers* who become irritated because *they can't get what they want.*

Improved purchasing power of all classes, but particularly the lower income brackets. Fewer of the low-use customers are low-income customers than ever before.

Better purchasing power in general.

Marriages and newly-established homes with resultant use of old homes and the construction of many new homes offer new load lines. Since line extensions are limited by the defense program, business must be held within our present distribution system. There will probably be little slackening of home building here, as it has been declared a defense area.

Demands beyond our lines for service constitute a reason for dissatisfaction if not made clear to our friends.

Realization of customers to get fuller and more complete use out of electrical equipment in the home and on the farm. Greater ability and willingness to keep all appliances in use and in repair.

The Better Light-Better Sight program will swing into new popularity through an abundance of favorable circumstances such as: Continued patronage of medical and other authorities interested in eye conservation through general health welfare; longer hours of production; new shops and factories that install high intensities for greater efficiency. This is followed by a natural tendency to increase wattage on the farm and in the home. Better standards will result. New commercial installations will add momentum to the cause. Also, those families needing light the most will be able to buy. General domestic lighting load is desirable as it is not ordinarily heavy in any one location. Good light is vital to the Emergency Program.

The continued sales promotional effort of the manufacturers, the distributors and appliance dealers who supply the market.

The widespread use and value of electric service as evidenced by its low cost and practical application everywhere.

A large proportion of the effort of the residential and farm sales department of the Northwestern Electric Co. is now centered on mass selling, not forgetting, however, that daily contacts of a small sales personnel with the individual customer, wherever possible, are inevitably productive of excellent results.

Mass approach means not only the printed media, but also the reaching of customers through clubs and group organizations. Personal contacts with such groups can do much to cement good public relations. Programs, motion pictures and various demonstrations are furnished for Granges; church organizations; women's clubs; Campfire and Four-H clubs; local business men's clubs; school children, grade and high school; electrical contractors and builders; manufacturer and jobber groups; electrical appliance dealers; keeping in touch with federal and state agencies.

Such work becomes more important than ever in the existing emergency. In addition to this effort, there will be a substantial plan to reach customers through the media of daily newspapers; community newspapers; *Northwestern Farm News; Northwestern Dealer News;* announcements enclosed with monthly statements; window displays; displays at fairs and bazaars; news releases of general benefit to the community regarding electric service; direct-by-mail methods will be continued for reaching electrical appliance dealers, manufacturers, and distributors in related problems.—*James B. Buman, residential and rural sales.*

Pacific Power & Light

Dollar volume of domestic appliance sales reached an all-time high last year in the territory served by Pacific Power & Light Co. Unit sales in 1941 show substantial increases over 1940 on all items except vacuum cleaners and IES lamps. Especially noteworthy is the increase in range and water heater sales, probably stimulated in part by our $444.000 rate reduction of May 22, which was publicized extensively to feature the economy of electric cooking.

The reduction cut rates approximately 10%. Rates in Yakima, Wash., for example, are now 74% below 1910 when the company first began to serve the city. In the 90-day Revenue Recovery drive which followed the rate cut, all classes of customers were advised of their personal savings and the increased use available under the new rates as compared with previous bills. Salesmen visited 33,022 separate customers to give them a personal rate presentation.

An increase of 113 kwh. in the average residential consumption per customer is traceable to some extent at least, to the additional appliances placed in service during the year. The benefit of this volume of sales from a load growth point of view will continue through the first half of 1942, unless it is necessary to ration power or otherwise effect curtailment. Such a program does not appear probable and we have made no revision in our estimated quotas for the current year, which are listed in the table according to our 1942 budget. There have been no material changes in our plans, despite the actual declaration of war; although we expect to place greater emphasis on war production and pledge full participation in the application of our service and our facilities for use in civilian defense.

During the precautionary blackouts immediately following the war declaration, we experienced a material drop in load and in business generally, but the upswing in Christmas spending and Christmas activities soon approached normal; and the month ended with substantial increases over the same month a year ago.

In view of these circumstances, we are reasonably optimistic about the future, recognizing, of course, that many limitations will still apply to appliance and service facilities.

The company has discontinued direct sales of major appliances to increase the number available for dealers. The present situation has not made any change in the number of dealers in the territory so far. It is estimated that about 10% more dealers are now providing appliance service. An advertising campaign will be conducted by the company in 1942 to encourage reconditioning of old appliances.

The company's sales staff was decreased upon retirement from the direct merchandising field. Eight home service girls are employed and in 1942 will spend a greater portion of their time working with dealers. A slight decrease in advertising volume is anticipated and copy will comply with OPM and defense requests.

Higher levels of illumination and increased use of service were secured from the company's 1941 lighting program. It is believed that the present emergency will prevent normal load development plans. Nine salesmen were engaged in pushing commercial cooking equipment sales in 1941 and the load increase in this classification is estimated at 5000 kw. Counter cooking de-

vices were featured in direct mail advertising and sales calls.

Air conditioning sales in 1941 included 300 commercial, 362 home and four industrial evaporative cooler installations. Ten of the commercial and 27 of the home installations involved refrigeration.

Competing fuels in the territory are gas, wood, coal and oil. It is probable that the emergency will affect the supply of these fuels less than electric service, which is used extensively for aluminum production.—*D. B. Leonard, commercial manager.*

Portland General Electric

While there was a decrease in range sales during the last quarter due largely to the 10% excise tax and the increased down payments and shorter terms, particularly on combination sales, the last quarter was nevertheless quite satisfactory. At the close of business, Dec. 24, 1941, 8,989 ranges, 3,957 water heaters, a total of 12,946 units sold by dealers were connected and verified. We think it is a pretty good job, and the figures would have been considerably greater had sufficient electric water heaters been available, particularly since about last June.

The average annual kwh. consumption per residential customer was 1,698, quite close to our estimate; somewhat reduced by the blackout conditions during December. Compared with 1,518 for 1940 it is an increase of 181 kwh. per customer, or 11.9%.

Electric range and water heater advertising has held up quite satisfactorily the last quarter, due largely to our allowance to dealers of $4 for each range sold and connected and $7 for each water heater sold and connected. This advertising allowance in the case of ranges may be applied to pay half of the dealer's advertising costs; in the case of water heaters, may apply to up to 75%.

The situation in this area so far as the supply of electric ranges for dealers for the first quarter of 1942 is satisfactory. If anything, however, the supply of automatic storage type water heaters is getting worse, and I question if more than 25% of 1941 stock will be available for resale during 1942. We are continuing our advertising allowance to dealers for the first quarter of 1942 but conditions may occasion a change in our advertising policy after April 1.

We still feel that approximately 50% of the 1941 volume of ranges will be available taking into consideration local jobbers' stocks now on hand for distribution for the first quarter. (Figures for 1942 in the table are for 100% stock availability. A 50% volume is expected.)

Immediately following the imposition of the excise tax there was a considerable let down and discouragement on the part of dealers and salesmen, but this condition has since improved and while our dealers' attitude is not 100% we believe it will continue to improve.

This huge electric star, built by El Paso Electric Co.—300 ft. wide by 460 ft. high—was visible from an airplane 25 miles away during the Christmas season

Of course the specialty dealers are hardest hit, as there is no certainty that even those who have broadened their lines of merchandise will get lamp socket devices, fluorescent lighting equipment, etc., in sufficient quantities to make up for decreased range, water heater, refrigerator and laundry equipment sales.

Total dealer outlets have been reduced about 5%, principally smaller dealers who either have not been able to secure satisfactory volume of merchandise or who have not been able to stand up under present competitive selling conditions. There were approximately 350 dealer salesmen employed in our territory in November, a decrease of about 35 in the ninety days preceding.

This is very much an electrical territory. The competing fuels are manufactured gas, oil and wood.

Approximately 1,500 kw. of promotional type commercial and industrial lighting load was added last year. Load increase in counter and heavy duty commercial cooking was about 1,000 kw., from 85 installations. Something between five and ten refrigeration air conditioning jobs were installed.—*A. C. McMicken, general sales manager.*

Texas

El Paso Electric

To meet present emergency conditions, El Paso Electric Co. will further aid its dealers in securing appliances for sale and display. The company also will continue to extend service lines wherever possible. The situation to date has made no change in the number of dealers in the territory, although dealer advertising is off 25% and volume of sales has been cut approximately in half due to credit restrictions.

The company has purchased all repair parts possible to encourage reconditioning of old appliances as a defense measure. It expects to keep a full crew of salesmen, who will both sell and maintain customer contacts; and no reduction is contemplated in the advertising program.

Outstanding sales events of 1941 were shows, exhibits, cooking schools and campaigns. The company maintained an active file of salesmen applications to assist dealers in securing employees and held two training classes for dealer salesmen.

A 4% reduction in domestic rates was made in the rural districts served and no need for a rate increase is foreseen by the company. (Major competition is from natural and bottled gas.) General business conditions in the territory during 1941 were approximately 30% above 1940.

It is believed that the present emergency will bring a 7% increase in commercial and a 2% increase in domestic lighting. Sales of air conditioning equipment in the territory included 1230 home and 410 commercial evaporative coolers, with two commercial installations involving refrigeration.—*R. K. Banner, merchandise manager.*

Utah

Utah Power & Light

In preparing our plans for this year they were set up on a wartime basis. Consequently up to the present time we have contemplated no changes. It will be remembered that in Aug. 1940 our company discontinued the sale of all major appliances through our own company stores. At that time our sales department was reorganized on a new basis, by which dealers make all major appliance sales throughout our territory. We have, since that time, maintained a staff of approximately 20 sales promotional men and women, to carry out our dealer program. These people do no selling themselves.

At a series of meetings with division organizations, and later jobber organi-

(Continued on Page 77)

Electrical West

Business Guide

For Electrical Dealers and Salesmen

What to do 'til the Doctor comes

They used to laugh at the string saver, but soon he may be the only one with string enough to tie up a bundle. Many a dealer has felt the same way about a service department, but it may be what **keeps** him in the sugarless, applianceless days ahead.

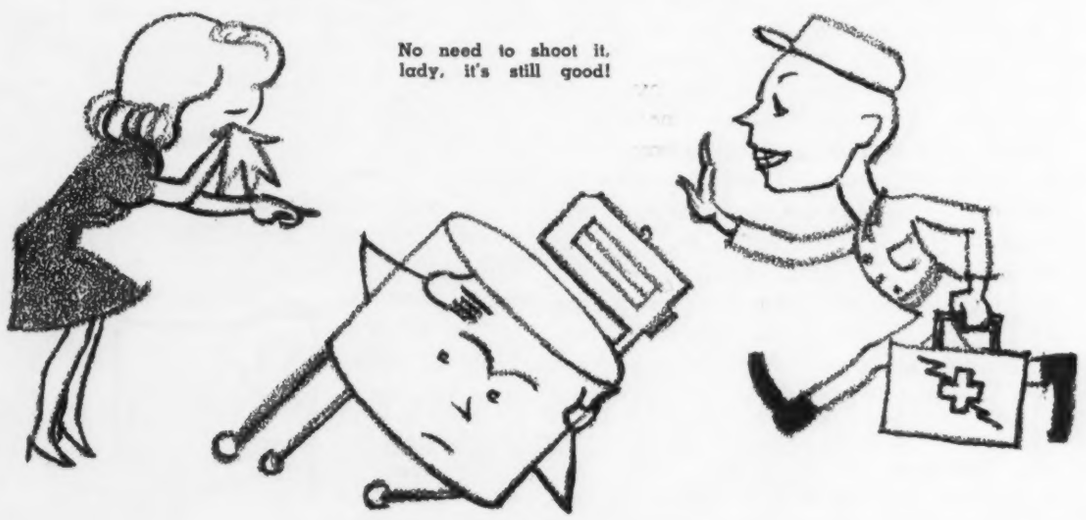
This nation is going to war and it doesn't mean maybe. The dealer who used to persuade the customer to trade in or junk the old appliance in favor of a new one will find it to his interest to persuade her to have it repaired and make it last instead.

A glance at the saturation and replacement figures tells what a market there is for repair service. Anyone with a mechanical sense knows that any piece of equipment needs maintenance and repair. In the auto industry twice as many are employed in the service and repair branches as in manufacture. Of recent years dealers have been mechanizing the American home. With every new appliance the maintenance problem has been added to. Yet only a few dealers have specialized in repairs. Still fewer have put **salesmanship** back of their repair service to offer the user a maintenance service similar to that which every modern factory or industry or office building has. The upkeep, oiling, cleaning, inspection and repair of home mechanical equipment has been left to the man of the house.

With more of the men of the nation called to duty or to defense production, women are more likely to need and appreciate an appliance and repair service that will relieve them of every worry and permit them to devote their own efforts to war work. After all, they were sold the appliance with the promise that it would free them, enable them to engage in other activities. If they have to go back to doing their housework "the hard way" the Red Cross work that is so necessary will suffer too.

Reason dealers haven't done much with repair service may have been that it was not profitable. There was too much **free** service. A trip out to make one minor repair cost so much that the dealer did not have the heart to charge what it cost, or if he did the customer thought he was a robber. The remedy for that problem is to develop several repair jobs on one call wherever possible; better yet to have customers bring several appliances in to the shop for overhaul.

This is the time to look into the possibilities of doing a more thorough job in repair and service. The OPM and its successor, WPB, has promised enough materials for repair parts, manufacturers of electrical appliances have plans to aid, your utility is eager to help and your customers need it.



No need to shoot it, lady, it's still good!

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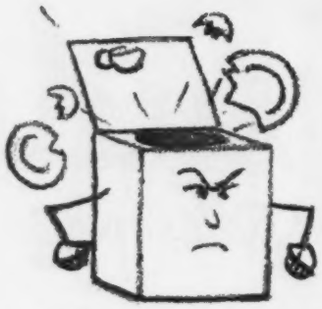
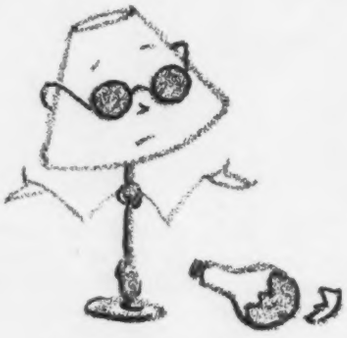
February 1942

Make Your Back Shop Keep You



Seek and ye shall find—the wrathy dishwasher

Jumping blindly into service and repair after years of selling of new to replace the old and worn appliance may not be as easy as it looks. The man who goes into it with his eyes open and sets himself up to cultivate his service and repair business just as enthusiastically as he did the sale of new merchandise will be the one who comes through this war with a business that survived and the good will of his customers that will launch him on the sale of new appliances when they are again available in quantity.



—the lightless-sightless lamp

Tinkerers and fixer-uppers who are satisfied to "just get it a-runnin'" there are and will be, but the service shop that commands respect is better than that. It really makes a business of service work. So, like any successful business, it is organized to do its job. This involves:

1. Change of viewpoint—that the repair and service department is a producing department, rather than necessary overhead that goes along with selling new merchandise. In normal times it may have been needed to make installations and minor repairs or carry the customer through the guarantee period, or it might have been bait for prospects who could be persuaded to buy a new appliance instead of having the old one repaired, but now instead of keeping the back shop, it may be a case of the back shop keeping you.

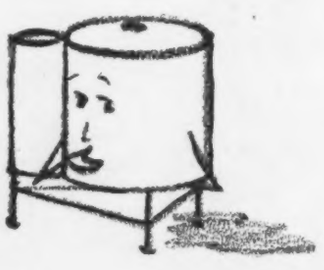
2. Selling—to let the public know that a desirable and thrifty service is available and to produce enough volume of it to pay the cost and a profit. If everybody goes into servicing for the duration it will be the outfit that organizes itself to sell and produce business that will survive, just as it is in all business.

3. Policy—as to price and terms and quality. **Prices** should be made perfectly clear to the customer, and the crew should know how to justify them to the customer's satisfaction. That takes a sales approach again. **Terms** should be cash if at all possible, collected while the value is fresh and appreciated. **Quality** is the result of the next items—

4. Tools—to do a clean, workmanlike job quickly and without damage to the appliance. **Nothing gripes customers more than to have appliances returned to them scarred and butchered by careless handling or unskilled workmanship.**

5. Stock of repair parts—varied and complete enough to do the majority of the work. Well displayed in bottles or bins, it gives the customer confidence in the shop and its ability to do a reliable job.

6. Trained workmen—mighty hard to get these days when war jobs take the cream. Investigate, however, the possibilities of mechanically minded high school and college students, partially disabled mechanics, even women mechanics. The mechanically minded salesman, otherwise out of a job, could learn quickly and tide himself over the war, perhaps. Many men, over age for war industry jobs, should be available if sought out.



—the damp damp-dryer

7. Accounts—so that you can watch the costs and keep them in line, and also so that the staff will be stimulated to watch costs themselves and improve efficiency.

In switching from the new merchandise viewpoint to that of reconditioning present appliances, salesmen will not have the new gadget appeal of late models to work with. Instead here are the appeals around which to build sales of repairs and reconditioning—better yet, of home appliance maintenance service.

1. It's patriotic to conserve metals by making the old appliance last longer.

2. It's thrifty to make things last and be able to use the money for some other worthy cause—defense stamps and bonds for example.

3. Familiarity with the operation of the old appliance.

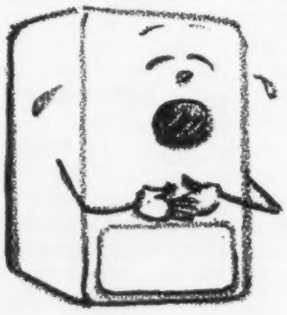
4. Renewed value—it may have been out of service a long time, now it can be enjoyed again and all its former advantages renewed.

5. Investment protected—by prudent upkeep, not depreciated so fast.

6. Business does it for all its equipment, why not the home? —trucks and cars, typewriters and office machines, plant equipment are all inspected and maintained regularly.

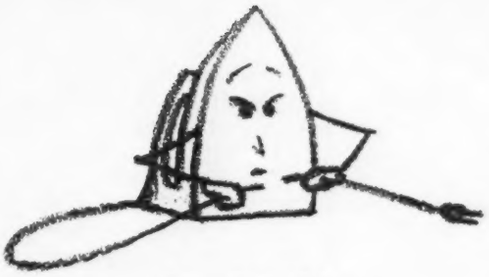
—the ice cold toaster

A by-product idea—to sell the householder the cord, extensions, or installed outlets to make the use of his appliance really convenient. Many are not used because it is too much trouble, or cords are not at hand.



—the hot and bothered refrigerator

Tools and a well organized repair shop make it easier to keep costs down. They



—the unglad sad iron

should be selected with care and kept in place and in good working order, it goes without saying. The neat shop commands respect. On the other hand too fancy a shop may create a fear of overcharge. There's a happy medium.

A work bench equipped with a test panel, big vise for big stuff, small for small work, a drill press, lathe, arbor press, good tool-steel drills and taps and dies, various hand tools and socket wrenches, some with long extensions to reach into difficult places, silver solder, ordinary solder—a good mechanic can do better service work so equipped, a medium mechanic can fare better than without. In a pinch some parts no longer obtainable can be made in a well-equipped shop.

Conserve rubber by planning pickup and delivery to make one call do the work of several. It may mean asking a customer to wait a day or so, but if it is explained most people will cooperate.

Cooperate with your utility, your wholesalers, your fellow dealers more than you ever did before. It is their war too, and by team work, sharing, mutual sacrifices, we can all see it through.

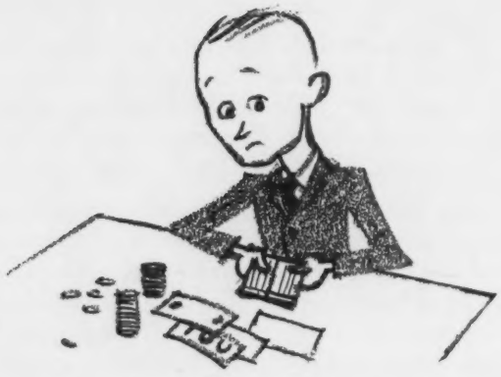
Any extra service you render your home town folks during their hard times will earn you goodwill that will repay you after it is all over in friendly prospects, knowledge of the condition of their appliances and a reliance on you to continue to serve them.

PUGET SOUND POWER & LIGHT CO.
PORTLAND GENERAL ELECTRIC CO.
CALIFORNIA OREGON POWER CO.
UTAH POWER & LIGHT CO.
IDAHO POWER CO.
ROCKY MOUNTAIN ELECTRICAL LEAGUE

The Control Station

second of series of good sense articles on business management

by Ken Hampton



TRADING, buying and selling, is business. Something is purchased—changed in some manner, either by being made into a totally different form through manufacturing processes, or moved from one place to another for use or sale in the same form and sold again. Buymanship and salesmanship go on constantly in all business.

When one person, or a group of people decide to engage in this process called business, they go through certain steps which it is well to understand before we proceed with our discussion on merchandising.

First, they gather together an amount of cash. Before there can be cash available to them, some one or several people must have spent less money than they received. Thus, all business starts as the result of thrift and saving.

For the sake of this discussion, we shall speak of the owner of the business as an individual. Please don't let the terminology mislead you because the ownership may be and often is invested in many individuals gathered together in a corporation or partnership. But, regardless of wherein the ownership lies, the principles we are explaining remain fundamentally true.

The owner then sets up some kind of control over his cash. He probably deposits it in a bank and keeps a record book. For this discussion, we will call this control his office. Here again, his office may be a bank and a few notes he makes himself—or it may be many people keeping elaborate records. This office becomes the **control point** of the business.

With his cash he then buys supplies. These supplies, either raw materials or finished goods then become his inventory. He now has some of his cash in goods, so his control office has both cash and materials to watch and account for now.

The owner then provides space for these materials. This space becomes his store or factory.

His next problem is to turn these materials back into cash at a profit to himself. To accomplish this he hires an organization and equips them with the necessary tools with which to work. Since this is to be a discussion of merchandising we will call this the merchandising organization. They are charged with the function of turning the owners' goods into cash at a profit to him.

In carrying out their assignment, they often find that the people who want to buy the merchandise cannot pay cash for it but will promise to pay for their purchases at some later time. This custom gives rise to accounts or promises to pay sometime in the future. These are known as accounts receivable. These the merchandising organization tenders to the owners' control office, and if acceptable to them, come under their control, to be turned into cash at a later date. When this happens, the control office has added a new problem to its guardianship of the owners' assets. It now must guard, account for and collect some promises-to-pay from several sources often remote from the headquarters' location.

Here in chart form is shown this cyclical process that is the complete functioning of any business.

CASH

O	**INVENTORY**	O
F		W
F	**MERCHANDISING ORGANIZATION**	N
I		E
C	**ACCOUNTS RECEIVABLE**	R
E		

CASH

An owner takes his cash savings, buys some materials, changes this material in some way, sells it for cash or accounts receivable which he turns into cash. If he goes through this operation profitably, he is successful—if not, he is soon replaced by someone who is successful, for all business must operate profitably to survive.

The organization he uses to carry on this work divides naturally into a **control organization,** generally called his office, which becomes guardian of all the property, whether cash, inventory, accounts receivable, real estate or personal property—guards it and accounts for it to the owner—and a **producing organization.** This producing organization falls naturally into further divisions of sales or distribution activities and manufacturing functions. Above all of course is ownership which is responsible for guidance and administration.

The above explanation of course is extremely simplified, but its thorough understanding is necessary as a basis from which to judge any explanation of a business.

We set it down here to refresh your mind before we proceed with specific comments.

zations and finally to dealer meetings, an outline of the new responsibilities of these promotional men and women was announced. In these meetings mention was made of the new conditions brought about by war, the location of war industries and encampments and army supply and service depots in this area, and our patriotic aims to aid the war program and to conform to OPM policy. The company itself will no longer advertise or promote the sale of appliances or services which may cause a need for extra maintenance, improvements to plant, revamping of distribution and substation facilities.

Therefore we will curtail in all but defense fields. Our program however will be: (1) to convey ideas rather than sell merchandise or service; (2) to contribute to national defense by helping customers make the best use of our service and conserve their own time, labor and money; (3) to sell and keep sold the advantages and low cost of our service for future load building; (4) to convince the public of the importance of Reddy Kilowatt power to national defense; (5) to preserve and encourage unity of public thinking and maintain public morale; (6) to urge the public to buy defense stamps and bonds; (7) to preserve the American way of life and encourage initiative and enterprise; (8) to build goodwill and improve customer relations, and (9) to keep expenses strictly within the budget.

The sales organization will be maintained and advertising will continue in the same media. *Electro Dealer*, our dealer paper will be carried on, but in all cases emphasis will be placed on the above. The company now merchandises only lamp bulbs and IES lamps and small appliances and the figures in the tables therefore are those of dealer sales except for air heaters and IES lamps. Sales of traded in appliances are included in dealer figures. Quotas for 1942 are estimated on an assumption of approximately 50% of 1941 stock being available.

Our sales promotion men will work with dealers, try to keep them informed of new trends and orders, cooperate in their plans, make up monthly reports of sales for general information, sell the cheapness of electric service as an aid in dealer sales, promote the electric way of living, assist in training dealer personnel, help in group demonstrations and encourage servicing of old appliances.

Dealer promotion women will make calls upon the request of customers or dealers, assist in training salespeople, conduct group demonstrations, contact home economists and teachers, keep school equipment in good condition, help at church and fraternal organization meetings, assist the country's food and nutrition program, help new users with appliances.

Commercial and industrial salesmen will seek to confine their increase of kwh. per customer to government users and projects, and with regular commercial customers will explain rate revisions, adjust complaints, renew contracts, show customers how to use their present equipment more efficiently, promote off-peak and power factor corrected usages, encourage subcontracting for government production.

Rescinded will be our offer to install range wiring for $22.50 and water heaters for $20 since the acceptance and usage of ranges has lessened the need for these inducements. Our radio program, "Better Living Electrically" will continue but with emphasis on keeping appliances in repair, food and nutrition, and defense bonds.

Last year our 9 all-service commercial salesmen increased commercial cooking load by 1,224 kw. with some 200 new jobs. Commercial load increased 2,854 kw., industrial 394 kw. Natural gas and coal are competing fuels. The Electrical League of Utah will continue as the industry's service organization with our full cooperation. —*W. A. Huckins, sales manager.*

Telluride Power

Merchandise sales were up about 20% last year in the territory served by Telluride Power Co., Richfield, Utah. Other business remained close to the 1940 level. The company foresees increased dealer advertising during the present emergency, with expanded service departments and a possible reduction in sales staffs. Its own advertising policy will be the same in 1942 as in 1941.

Washington

Grays Harbor PUD

The general effect of the war declaration has been to revise downward the estimated sales for 1942. The problem of dealers is one of receiving deliveries on their orders and further curtailment is expected. We originally estimated that 75% of adequate supply of appliances would be available but this should now be reduced, possibly to 50%.

Christmas sales in the large appliance field dropped off to some extent, due in a large measure to the tightening of credit and down payment restrictions. Sales of small appliances were up to expectations, however, and in some cases exceeded the anticipated volume. The tendency this year was to buy earlier, which reduced the seasonal rush but maintained fairly well the overall volume for the closing months of the year.

Outdoor lighting was reduced about 25% from the 1940 holiday season. This was due, it is believed, entirely to the blackout restrictions enforced in the area during the second week in December and the possibility of further blackouts being enforced during the holidays.

The increase in domestic kwh. consumption in 1941 is attributed to a rate cut of approximately 10% effective Jan. 1, 1941. The PUD does no merchandising, but cooperates with dealers in displays and sales. Gas and wood are the main competing fuels.

The utility foresees a decrease in dealer advertising and expects to curtail its own advertising somewhat. Credit restrictions have decreased dealer sales approximately 20%.

A range and refrigerator repair department is maintained by the PUD but it has no separate repair department for small appliances.

An All-electric Home campaign was started in March, 1941. The new all-electric home rate (necessitating installations of electric range, refrigerator and water heater) was explained through the mediums of newspaper, radio and house-to-house canvass. Cooking schools held throughout the year were exceptionally well attended, showing considerable interest on the part of our customers in the advantages of electric cooking. Average kwh. use for residential customers was stepped up approximately 20% as a result of the campaign and the cooking schools. *William S. Hill, acting manager.*

Puget Sound P & L

Effective Jan. 1, 1941, the company discontinued all direct sale of merchandise outside the City of Seattle. The company's domestic load building program has, therefore, been principally furthered by a dealer cooperative activity. Company merchandise sales in 1941 amounted to 1,300 ranges, 1,150 water heaters and 400 refrigerators. Dealer sales consisted of 12,000 ranges, 8,500 water heaters and 33,000 refrigerators.

The company's dealer sales program was built around campaigns featuring water heaters, ranges, roasters and light conditioning. In addition, the education of dealer sales personnel and the supplying of general factual information formed an important part of this program.

The Spring water heater campaign was titled *The Electric Water Heater for Home Defense.* This campaign featured generous use of Modern Kitchen Bureau material and the education and instruction of dealer sales personnel. A complete water heater sales manual was prepared for presentation to all water heater dealers and this proved to be of

major importance to the water heater program throughout the year.

Feature campaign of the year was the *Light Conditioning for Defense* program for October, November and December. This campaign enlisted the support of all electrical dealers and jobbers in the area. Generous use of customer handout material, sales manuals for dealers and their sales personnel and a series of lighting clinics formed the basis of the program. The clinics consisted of a series of three meetings held in each of eight principal centers in the territory. The enthusiastic participation of dealer sales personnel at these meetings was evidence of their success. This program was supported by consumer promotion by commercial, home service and farm electrification representatives through group meetings, dealer store demonstrations, light conditioned model homes and consumer sales contacts. Considerable increased interest in lighting equipment has been evidenced already. The program has proved to be very timely inasmuch as it encourages the sale of equipment which is in the main little affected by the present emergency.

Newspaper cooking schools were a very important part of the home service program. In addition, this program featured group meetings on lighting and electric cookery for women's organizations. A total of 750 meetings and cooking schools was held and the attendance was in excess of 40,000. This was accomplished by an organization consisting of a home service director and 11 home service representatives.

The farm electrification section was again responsible for the company's display at the Western Washington fair at Puyallup. More than 310,000 attended the fair this year. The company booth illustrated many uses of electricity on the farm and also included a theatre featuring experiments with electricity and light. A model greenhouse was displayed and attracted interest among amateur and professional flower growers. To answer the questions of our customers in regard to the application of electricity in the greenhouse, a booklet entitled *Electric Gardening* has just been issued. Exhibits were entered also at the Seattle Better Housing exhibit; the National Flower show; and the National Restaurant association convention.

The commercial and industrial section carried on a balanced program but especially featured the promotion of high level fluorescent lighting installations. During the year 3,750 kw. of additional lighting were added as a result of the efforts of this section. Also added were 750 commercial cooking installations, totalling 3,500 kw. Assisting the promotion of fluorescent lighting in this area, a manual titled *Fluorescent Lighting Objectives* was issued. Educational assistance was provided the lighting trade and profession on the use and sales of fluorescent lighting through lighting institutes held in each of the commercial centers. Consumer education also was carried on through demonstration lectures to various commercial group meetings throughout the year. This has proved to be of major assistance in the proper installation and use of this new light source in the territory served. During the year an advisory service to architects was set up to assist in the specification of modern adequate lighting.

Seven air conditioning installations were made during 1941.

It is contemplated that the 1942 sales program will give principal consideration to assisting customers and dealers to adapt their requirements to the needs of the present emergency. The dealer cooperative activity will continue with an educational program designed to inform dealers concerning electrical equipment, rates, service and so forth. Encouragement will be given to repair and rehabilitate existing equipment as a means of filling in the vacancies created by the lack of sufficient new equipment. In most of the areas served there will be a considerable demand in 1942 for electrical equipment, inasmuch as this is one of the major defense centers of the nation. The amount of business done will largely depend upon the availability of new equipment.—*Henry R. Kruse, sales promotion manager.*

Seattle City Light

There will be no change in our sales plans for 1942 unless there is a further curtailment of electric range and tank manufacturing. Our experience is that a utility can get greater results from the promotion and sale of these two appliances than any others. Ranges and water heaters sold by the dealers and ourselves this past year will account for approximately 30,000,000 additional kwh. in residential consumption alone. That's worth working for.

During 1941 City Light sold 2984 and dealers sold 1312 tank-type water heaters out of an estimated 5300 water heaters sold In setting up quotas for 1942, the Department estimated that 100% of the ranges would be available and 50% of the tank water heaters.

December sales were 4.8% of the 1941 business, while December, 1940, sales were 8.7% of the year's business. Our scheduled advertising was carried out. We never anticipate increased sales due to Christmas buying, but rather a decrease because of the increased buying of small appliances. Christmas tree lighting fell off about 20%. Dealer morale appears high, perhaps partly because this is a defense area and prospects of getting merchandise appear fairly good.

Through department advertising and dealer contacts we have encouraged the sale of diversified electrical equipment. Dealers have cut floor space displays drastically and have curtailed advertising. Credit restrictions have effected dealer sales volumes to a great extent.

The number of commission salesmen will be decreased by the department if electric ranges and tank water heaters are not available. Home service girls will increase their activity in nutrition, low-cost menus and coordination with University and government educational data.

City Light will reduce its advertising budget slightly. Gas, coal, wood and oil are competing fuels.

The department's dealer contact man assisted dealers in securing salesmen in 1941 and the department furnished dealer salesmen printed information relative to installation and operating costs of electric cooking, water heating, lighting and other equipment. Home service girls conducted dinners and demonstrations for distributors and their dealer salesmen during the year; and cooking schools conducted by the department on dealer sales floors increased floor traffic and helped salesmen to give better equipment demonstrations.

The department's lighting program had resulted in the installation of 432 kw. of improved commercial and industrial lighting up to November 1. During the year, the department ran newspaper advertising pointing to the safety of adequate lighting. It is believed that the present emergency will increase the demand for higher illumination levels in commercial plants.

Commercial cooking promotion in the territory in 1941 resulted in seven large installations, totalling 400 kw. and many smaller counter equipment sales.

General business volume in Seattle during 1941 was the greatest in the history of the city.

The department conducted a series of 12 church cooking schools. These were given in church auditoriums and women's committees were allowed to charge admission and build their church treasuries. The series was important because each demonstration attracted a different group of women. Total attendance was 4,200.

A series of eight demonstrations was given in the City Light auditorium on *Nutrition for National Defense,* showing proper cooking to retain vitamins, proper preservation and cost accounted menus. Guest speakers at this series included Beryl Smith Gridley, field representative from Washington, D. C. Of-

fice of Price Administration; Margaret Hannay, director, Washington State Dairy council; and Helen Mitchell, nutritional consultant on Civilian Defense.

Participation in the third annual Housing Show and in various national conventions and displays of commercial cooking and electric water heating equipment were other events of the year. The department also maintained a model electric kitchen in the permanent exhibit of the Master Builders.—*P. C. Spowart, sales manager.*

Tacoma

The City of Tacoma Department of Public Utilities, Light Division estimates that 50% of its 1942 appliance quotas will be available for sale in 1942. Since other types and lines of merchandise were added in 1941 to offset restrictions in electrical appliances, dealers have not been reduced in number and have not cut their sales staffs. Dealer advertising was off approximately 50%, however, and credit restrictions have cut dealer sales volumes approximately in half.

The utility has increased its service department to care for the unusual number of service calls and has been salvaging parts from old appliances.

No reduction in the department's sales staff is foreseen. Fewer ads will be run in 1942, although the advertising policy is expected to remain the same.

With the cooperation of manufacturer's sales departments, a thorough coverage was given commercial cooking promotion in 1941. Two salesmen were engaged in this activity. Wood and manufactured gas are the major competing fuels in the territory.

Outstanding events in 1941 were a Better Housing Show in February; daily meetings in City Light demonstration room for clubs and women's organizations; complete coverage of the city by outdoor billboards in May and September; radio spot announcements covering ranges and automatic water heaters during June. This program resulted in greater customer interest and increased sales, particularly in automatic water heating.

Annual figures given do not include industrial customers.

Washington Water Power

Washington Water Power Co. plans to discontinue the active promotion of appliance sales. The company aids dealers with training schools for salesmen.

An over-all domestic rate reduction of 13.2% was made by the company in 1941. Major competing fuels in the territory are coal and wood.

A large curtailment in appliance selling is expected due to scarcity of equipment. General business conditions during 1941 were good throughout the territory served.

Washington Water Power domestic salesmen were given special home light conditioning training courses last fall

Results of the 1941 lighting program were good but the 1942 program is undecided as yet. The company's policy is to urge the use of fluorescent lighting wherever it is in the customer's interest and to advise adequate levels, based on seeing requirements.

A total of 500 commercial evaporative coolers was installed in the territory during the year, 30 of them involving refrigeration.

Industrial load increased 4,682 kw. in 1941. The company does not look for much expansion in the industrial field in 1942.—*R. B. McElroy, general sales manager.*

Wyoming

Rawlins Electric

Rawlins Electric Co., Rawlins, Wyo., is making a stronger and more concerted effort to hold business in line during the emergency. It is expected that dealers will curtail sales staffs but will attempt to maintain policies, service and advertising. The company plans to continue its present advertising policy and will make an effort to recondition appliances taken off the market by the defense program.

Sheridan Co. Electric

Sheridan Electric Co., Sheridan, Wyo., looks for increased dealer advertising in 1942; more rigid restrictions on credit policies; and larger, better equipped service departments. Employment of salesmen in the territory will be normal, the company believes. The company does not merchandise appliances but will conduct an extensive newspaper and radio advertising program on a dealer cooperative promotional basis at its own cost.

Hawaii

Hawaiian Electric

"We hasten to assure you that the HECO system suffered no damage and no members of the Reddy Kilowatt family were injured in the recent attack on the Island. We will not attempt to add any details to the newpaper and radio accounts of what happened here. However business is now getting back to something like normal with some changes to meet the new conditions. We are rather stymied in business as all service installations and wiring have defense repair priorities. We are also greatly handicapped at this season of the year by lack of merchandise. The irony of it all is that the one item of which we have a large supply—floor and table lamps—are not saleable at this time since the entire territory has been blacked out nightly since Dec. 7." —*a letter to Ashton B. Collins from C. E. Nolan.*

Outstanding event of 1941 was the celebration of the company's 50th anniversary. During October our main floor was appropriately decorated, we had displays of early model Westinghouse ranges in contrast with present models, one of the first electric light fixtures installed in Honolulu, and in addition a display of General Electric, Hotpoint and Westinghouse irons, table appliances; displays of old and new Hotpoint ranges, a mural loaned by Colonial-Premier Co. depicting the pageantry of light through the ages, and an exhibit of several hundred types of Westinghouse Mazda lamps. A special section of the Star-Bulletin was printed in honor of the occasion.

Open house was held between 10 a.m. and 5 p.m., Oct. 13, when approximately 1,000 people called, refreshments were served, cooking demonstrations were held all day. Printed recipes of foods cooked were given away. "Defense through the home line front" was the theme. Posters and exhibits told of vitamin values of foods, nutrition in relation to health, conservation of food through home preserving, suggested amounts and kinds of foods and supplies for home storage, fumigation of cereals for storage and the value of home gardening for defense. Information of this kind is vitally important to the islands this year in view of the emergency and possible curtailment of mainland food supplies.

Another outstanding activity was our 19th annual Hotpoint cooking school in May, lasting four days, attended by approximately 6,000 Honolulu homemakers. One of the most important activities has been the steady, continued work of

Fifty years of service to Hawaii was appropriately celebrated by Hawaiian Electric Co. last year. Though Oahu is blacked out now each night, electric facilities were undamaged and continue to serve behind obscuration. Above, the birthday cake and lighting mural, and native entertainers during the open house

our home economics department, conducted by Miriam Jackson Emery, director. In addition we have five home service girls. During the months of January through June and again in October, 41 classes were held for a total of 3,190 homemakers, an average of 77 per class.

Because of the language difficulties in the Islands many parents rely upon the information carried home by their children to guide them in purchase of equipment. Thus an important part of the home economics department activity has been in appliance demonstrations to homemaking classes. This year programs are being themed on better care and wiser use of electrical equipment in the student's homes rather than promotion of new equipment as in previous years. Two Reddy Kilowatt folders are distributed to students.

This department also cooperates with homemaking classes for dealers, salesmen and repair men to better acquaint them with the use of appliances. In May a series of five noonday meetings was held for dealers and salesmen. These classes proved so popular that similar condensed classes were held for repair men, emphasizing the use of range and refrigerator in relation to customer complaints and questions.

We have not actively promoted the sale of commercial cooking equipment but this was on the program for 1942. We have a record of 20 commercial installations of air conditioning involving refrigeration with a total load of 700 kw.

Our figures are only those sold and separately metered on the lines of the company. Many thousands more are sold in government housing projects, posts and on plantations, of which we have no exact record. Business in Honolulu has been unusually good, due to the influx of defense workers and population increase.—*C. E. Nolan, manager, promotion department.*

Canada

B. C. Electric Ry., Vancouver

Sales and promotion plans of the British Columbia Electric Railway Co., Ltd. will be determined after all factors affecting the wartime activities of the country have received first consideration. Government regulations of production, prices, selling activities and terms will be the major factors affecting appliance sales and there does not seem to be any possibility under present conditions of conducting any promotional activities or special campaigns.

Stock shortages are becoming increasingly noticeable each week. The company is studying ways and means by which its appliance repair department can become still more useful in maintaining customer appliances in first-class working order. Company advertising also will stress the need to keep present equipment in good condition.

Trade-in appliances were included in company figures and in some of the dealer figures in the tables. Stiff credit restrictions set by the Dominion Government and effective October 14, 1941, and stock shortages affected sales in the latter part of the year.

To date, the emergency has not affected the number of dealers serving the territory, although many small electric and gas dealers have added other lines, such as furniture, dry goods and hardware. Dealer advertising has been curtailed considerably. The better type of dealer is developing his service department to make this section carry part of the general overhead during the time that it is difficult to secure appliances.

A recent Government ruling has prohibited entirely after March 31, 1942, the further manufacture of certain small electric appliances, metal lamps and lamp standards, although stock already in the hands of wholesalers and retailers may be sold.

The Government is doing everything in its power to discourage people from buying at the present time any item that is not considered an absolute necessity and to encourage placing of surplus earnings into War Savings Certificates. Manufacturers have been placed on a quota basis and there is no definite assurance that even this lower production can be maintained.

Some reduction in the company sales force is reported due to the fact that vacancies created by military enlistments and transfers to other company activities were not filled under present conditions.

Gradual elimination of direct merchandising and promotional type of advertising with increased institutional and service type advertisements is the company's policy during the emergency.

Activities of the electric industry are coordinated by the Electrical Service League of British Columbia. Major competing fuels are sawmill waste, oil, coal, wood and gas, which is served by the electric company. Fuel oils for kitchen ranges and heaters are becoming difficult to obtain.

Results of the company's lighting

campaign in 1941 were excellent but it is uncertain how the emergency will affect 1942 plans.

Rural cooking schools were staged in the late spring and early summer, as in past years. Since the organization of our rural electrification department, a director has carried out a regular series of evening meetings throughout the farm areas served by the company and these were held in November.

Tying in with the war theme, the Seventh Annual President's Month in May was called a "Power Drive". Results of this campaign were very good. Other promotion in 1941 included a "He-Man" cooking contest, featuring a stage show at the Orpheum theatre, with some of the city's most prominent men appearing; displays at the Canada Pacific exhibition; homemakers' classes under the direction of the home service department; and the Seventh Annual Employee Lamp Globe campaign. —*W. C. Mainwaring, general sales manager.*

B. C. Electric, Victoria

While the events of December 7 were rather breathtaking and will bring in their train a series of changes which will be world-wide, they did not affect conditions generally in our territory as much as may be expected in territories within the U. S. A. That is to say, we did not and do not propose to make any changes in our plans for 1942. However, it is to be expected that restrictions in the sale of certain articles will be more effective due to the wonderful effort being put forth by the United States.

Sales of trade-in appliances were not included in unit figures supplied in the tables. It is estimated that only 50% to 75% of the 1942 appliance quotas will be available for sale in 1942.

There has been no decrease in the number of dealers in the territory but approximately 5% fewer salesmen are employed. There has been no increase in dealer service departments.

Increases of 250 kw. in commercial and industrial and 175 kw. in domestic lighting were effected by the 1941 lighting program. Supply of lighting equipment may be curtailed in 1942.

Outstanding in 1941 were the Annual Dealer meeting; regular weekly cooking classes for prospective brides and consumers; Rental Water Heater Cruise contest; and the "Switch to Electric Range" campaign.—*M. C. Truman, manager, light and power department.*

Leagues, appliance bureaus and societies reported to Electrical West their plans for 1942 also. Space for them, lacking this issue, will be made next month.

Hotpoint" Damns the Torpedoes"

Goes ahead with dealer meeting series as usual; Other manufacturers confine to smaller showings

WITH a courage worthy of its pioneer position in the appliance industry, Hotpoint this year was the only manufacturer to carry out a customary series of dealer meetings throughout the West. Graybar, distributor for Hotpoint in a majority of distribution points in the West, called the dealers together in each instance. Ward Schafer, of Edison General Electric Appliance Co., Chicago, toured the western territory for the showings and with the Hotpoint and Graybar merchandise executives in each area conducted the meeting and presented the new merchandise.

Graybar was rewarded by a large attendance of dealers even from distant points and despite present-day handicaps to transportation. To the San Francisco meeting, for example, held Jan. 16 at the Empire Hotel, came dealers from a 300-mi. radius of northern California and Nevada. H. A. Walsh, sales manager, and R. K. Banner, merchandise manager, of El Paso Electric, El Paso, Texas, came all that distance for the meeting. Other Graybar-sponsored meetings were held at Salt Lake City, Portland, Seattle and Spokane. In Los Angeles where Hotpoint is handled by General Electric Supply, a meeting for utility executives only was held.

Typical presentation was that made at San Francisco. The meeting was opened by Clyde Allen, merchandise manager, Graybar, and by Phil Carson, Graybar district manager and Harold Conklin, Hotpoint district manager. Steel kitchen cabinets were presented by J. F. McDaniels as a merchandising product by which the kitchen could be modernized step by step. The cabinet line offers dealers opportunities to sell steel cabinets for laundry, recreation rooms or other storage spaces as well as for the kitchen. A new sink, provided with a place for future installation of the disposall but containing no dish washer, was added to the line. Improvements in the dishwasher and disposall were explained.

Al Baughman, water heater specialist for Hotpoint, put on an amusing but pointed presentation of some of the obstacles in water heater selling, disposing of each one in turn by reciting decided advantages. The new ranges were presented by F. L. David who stressed the vitamin and nutrition saving qualities of electric cooking, attributes the electric range has always offered and which other fuel-type ranges have sought to imitate.

Harold Conklin presented the refrigerator line, showing the changes in construction to conserve critical materials but claiming improvements with each alternate material. Stress will be placed on the 7-cu. ft. model and the 3- and 4-ft. boxes will be eliminated from the line. Conklin emphasized that 1942 will be a buyer's market and will require a dealer to get maximum margins —not cut price—watch expenses more carefully for he will have more to pay, consider trade-ins more from what they are worth and at what they can be resold, develop repair and service business, and to ask for it rather than merely accept it, and to continue advertising.

Success of the Hotpoint picture

Hotpoint's dealer shows were addressed by Ward Schafer of Chicago, (left) in each city. At right, Harold Conklin, district manager, Los Angeles, shows the refrigerator improvements made in 1942 models despite materials handicaps

"Blame It On Love" caused the company to invest in a new feature length movie "Sauce for the Gander" and a supplementary picture "And the Pursuit of Happiness" which tells more of the product story. Together the films run 90 min. and are designed for a matinee promotion. A plan book has been prepared for dealers and promotional material is offered to make the film a major and a long-range selling tool.

Carl Hagstrom presented the laundry equipment whose advertising theme will be keyed to saving of time, labor and clothing in the general defense and war saving program. Accent will be placed on higher-priced models. As with the refrigerator and range, the home laundry line has been shortened to a minimum of models. A tumbler dryer is added to the line.

The Spokane meeting was conducted by V. E. McCain, Spokane manager for Graybar, and arrangements handled by L. V. Schroeder, merchandise manager. Joseph Platt, Northwest district manager of Graybar, Seattle, presented the program to the Seattle, Portland and Spokane Hotpoint dealer meetings. One hundred and fifty dealers from eastern Washington, northern Idaho and western Montana met at the Spokane meeting, Jan. 22.

Westinghouse

Westinghouse divided the announcement of its 1942 merchandise into presentations to distributors and then by distributors to small groups of dealers. Typical was the presentation by Westinghouse merchandise division at the Western Furniture Mart, San Francisco, to Westinghouse Supply Co. and H. E. Saviers & Son of Reno. Similar meetings were held in Los Angeles and Salt Lake City.

Westinghouse's program will stress the servicing and repair of appliances. It has prepared a film to instruct dealers in service procedure. Other films have been prepared to be used in consumer meetings with less of an emphasis on product and more on the benefits of electric cooking and refrigeration in the preservation of vital food elements.

Frigidaire

Frigidaire, which for several years has conducted the biggest appliance show to tour these parts, will not have a big dealer showing this year. Instead, individual small showings to groups of dealers are planned by each of the distributing divisions. First showing of the new merchandise was being made during Market Week at the San Francisco Western Merchandise Mart.

A scene from "Sauce for the Gander," Hotpoint's new feature length movie

General Electric

"It's easier to stay young electrically," is to be the theme for 1942 General Electric Co. appliance department promotion, it was disclosed to a western regional distributors meeting held at Del Monte, Dec. 4-5-6, 1941, at which the ranking executives in the department presented the line for 1942. Not so much newness in product as in sales plan, and with more emphasis than ever on the complete kitchen, was announced as the program.

With Ben Tassie, manager of appliance sales, San Francisco, as host, his western staff and the G-E distributors from Los Angeles, Fresno, San Francisco, Portland, Seattle, and Salt Lake City, were addressed by the following department heads from the factory:

Carl Snyder, manager of the appliance department: M. Sweeney, manager, refrigeration; Lou Miller, sales manager, refrigeration; Jack Poteat, manager, ranges and water heaters; Elmer Dvorak, sales manager, ranges; Ray Rich, sales manager, water heaters; Webb Theleen, manager, kitchens; Charles Enderle, sales manager, kitchens; Glenn Chaffer, sales manager, home laundry; A. L. Atkinson, manager, vacuum cleaners; Lloyd Hertzler, sales manager, vacuum cleaners; Art Brandt, sales manager, radio; Harry Deinas, advertising manager, radio; Boyd Bullock, general manager, advertising of merchandising and appliances.

General Electric, after having held a distributors' meeting at Del Monte Dec. 4, 5 and 6, just before the outbreak of war, has turned conservative in the showing of its new lines of merchandise for 1942. It has taken a larger space at the Western Furniture Mart for showing to dealers from the West and will conduct more open house exhibits at its distributors show room. Added to the line this year is a deep freeze unit which was shown for the first time at the Market Week.

Kelvinator

Kelvinator plans no dealer meetings this year either. Showing was made during Market Week at the San Francisco Western Merchandise Mart and small dealer gatherings will be called to the distributor's showrooms. Available stock is being distributed as equably as possible to the company's most active dealers.

Easy Corp.

Easy Washing Machine Corp. is not holding dealer meetings either but is conducting a series of special meetings to train dealers in the technique of selling the spinner-type washers. A series of meetings of this kind has been held during the late fall months and a second group is planned in the early spring. Emphasis of the campaign on dealer training will be directed to encourage the woman's participation in war work activities and to stress the advantages of the spinner washer in saving time and labor from housework by material savings in washing, rinsing, wringing, drying and ironing. Pictorial national advertising will carry the same theme.

Apex-Rotarex

Apex-Rotarex Co. plans no dealer meetings. Showing of the stable lines of available washing machines and ironers was made at the Western Merchandise Mart during Market Week.

● NATIONAL ADVERTISING program on electric ranges sponsored by the Modern Kitchen Bureau has been cancelled owing to exigencies of war and the probability of increased supply difficulties, it was announced by C. J. Coward, chairman of the bureau's range advertising committee, and advertising manager, Kelvinator div., Nash-Kelvinator Corp. Educational work on the electric range, as an efficient method of protecting natural food elements during the cooking process, and as a time- and labor-saver for American housewives in the emergency period, will be continued through the bureau's over-all operations. The electric kitchen and electric water heater programs of the bureau will continue as originally planned, according to W. A. Grove, of the bureau's plan committee.

● NOVEL RADIO promotion was conducted by H. E. Saviers & Son, Inc., Reno, prior to Christmas. A U. S. Defense Bond was offered for the old radio and Saviers promised to deliver the old set to any recognized charity named by the customer.

Running Water Clinic: Defense Aims

Clinic seeks greater productivity; release of labor and power into defense; fire protection

SINCE water is the life fluid of civilization, this year's proceedings of the Running Water Clinic, held recently in Seattle, were tied in closely with national defense. Running water applied on a larger scale means more productivity in food products, release of labor and power to go into other defense work, and fire protection.

Since the clinic was held, war has brought this latter consideration strongly to the fore. Small electric pumps in large numbers made available along with carefully charted local water supplies are of utmost importance in case of incendiary raids. This was proved in England, where bombing quickly disrupted the mains of large water systems and small pumps of all kinds were of great service. The small amount of water they can throw on an incipient fire is worth tens of thousands of gallons a few minutes later.

The clinic this year was held under the auspices of the National Water Systems Council as co-member with the Puget Sound Power & Light Co. and with the active cooperation of the University of Washington and the nine electric pump distributors in that territory. Meetings were held in Commerce Hall at the university, finished off with a dinner at the Meany Hotel. About 75 dealers attended, coming from all parts of the PSP&L territory. As at the first clinic last year, R. W. Clark, merchandise manager of the Puget Sound company organized the clinic and its program.

Dr. Howard Preston, dean of the College of Economics and Business was introduced by Clark and made the opening address. He was followed by Dr. N. H. Engle, director of the Bureau of Business Research of the University, Capt. Stephen E. Sanislo of the Seattle Fire Department, Al. E. Pierce, assistant director, priorities division of OPM and R. E. McCollom, manager pump department, Mitchell, Lewis & Staver Co.

It was at the round table panel discussion in the afternoon that much of the technical and semi-technical discussion was introduced. Dean E. A. Loew of the College of Engineering acted as monitor. The following list of subjects and leaders gives an idea of its scope.

Wells and Locations. Fred S. Jenson, R. M. Wade and Company.

Water Heads and Resistance. C. W. Harris, *Professor of Engineering,* University of Washington.

Irrigation and Applications. J. C. Scott, Puget Sound Power and Light Co.

Domestic Systems from Health Viewpoint. Maxwelton Campbell, *Chief Engineer,* State Department of Health.

Maintenance and Service. Claude Stewart, Polson Implement Company.

Controls and Wiring. C. W. Wildebour, Puget Sound Power and Light Co.

Space will not permit anything like a detailed account of the material presented during the day's meeting. Spotting just a few of the highlights, things like these cropped up:

What kinds of pumps should be used in what kinds of applications? That question sticks many people, dealers and electrical men alike. McCollom gave this list, which will help.

General Types		Plunger Centrifugal Rotary Turbine Ejector
Classification	Deep Well	Plunger Centrifugal (Multi-Stage Vertical Submerged) Ejector
	Industrial	Practically All Types
	Shallow Well	Plunger Rotary Centrifugal Turbine
Uses	Industrial	Practically All Types Centrifugal
	Irrigation	Centrifugal (Multi-Stage Vertical Submerged
	Domestic	Plunger Rotary Centrifugal Turbine
Application	Plunger	Domestic, Industrial
	Centrifugal	Domestic, Irrigation, Industrial
	Rotary	Domestic, Industrial
	Turbine	Domestic, Industrial
	Ejector	Domestic

Dealers and others not thoroughly grounded in electrical technology often think that a 110-volt motor will run anywhere on a supposedly 110-volt circuit. They don't know about drop in voltage due to resistance of the branch circuit. Keeping away from C's and E's and I's and squares this and that, C. W. Wildebour gave them a simple formula and explained it so that anybody could understand.

$$C.M. = \frac{22, \text{ times distance in feet one way, times amps.}}{\text{Permissible drop in volts}}$$

For permissible drop, he explained, take 5% of the initial voltage of the main line. If that is 110 volts, 5% equals 5.5 volts. Use that for permissible drop at the end of the branch. A motor alone will work on a drop of 5% of rated voltage. If lights are to be operated at the motor site, then use 2% in getting permissible drop. For amperes, take the amperes on the name plate. He also explained that C.M. stood for wire size and told how to look up the size of wire on a wiring table.

Give the farmer good advice as to pipe sizes and quote him on adequate capacity always. Don't be afraid of losing the order and start trimming on what the farmer really should have. Recently, Puget Sound tested 80 electric pumping installations. The efficiencies ranged from 10% to 50% when they should have been 60% to 70%. Stress efficiency always, in selling.

In helping the farmer pick well sites, consider health and sanitation; convenience; hydraulics; abundant supply. Under these come such points as:

In a well penetrating hardpan, 50-ft. depth is sufficient.

Have a good concrete or tile curb around the top. The deepest well in the world may be unsafe if surface water gets into it.

In locating a well, put it where the well drilling rig can get at it conveniently for the initial drilling or subsequent repairs; may save the farmer a lot of money.

Try to put the well where it will be of the most use in case of fire. A well located in the house is not much good when the house is burning down.

Locate the well where it will be no more than 30 to 60 ft. from the pump site.

In case of a well for irrigation, get near the source of electrical supply, to save copper cost.

Get it near the center of the tract to be irrigated.

Locate where its water will help in case of fire.

Locate in a low spot, generally, in an old river bed. Water should be nearer the surface there, though surface indications do not tell much.

All these factors cannot be used 100% in locating an irrigation well, but the thing to do is to consider them all and then try to strike a mean, or get near their "center of gravity" so to speak, after each is given its weighted importance.

The farmer is eligible to purchase from his supplier for both repairs to existing equipment and purchase of new equipment without the necessity of a priority certificate. Repairs for public and private irrigation systems comes under preference rating order P-100. If the farmer wishes to purchase new equipment in excess of what he already possesses, application should be made direct to Washington, D. C., on form PD-1A.

ELECTRICAL WEST

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Geared to War

AMERICA is fighting a war. We are all in it—as individuals, as citizens, as workers, as an industry. In some ways each of us will be affected differently. In many ways the effect will be the same. Younger men will go into the armed forces. So will a few older men who hold reserve commissions. The remainder—the army of men and women who comprise the electrical industry in all its branches—will have their work to do also. In their case, they will do double duty—their regular jobs plus "doing their bit."

It is for those whose responsibility it will be to see that the electrical industry functions at peak capacity and at peak efficiency that the editors have compiled this twenty-third annual review. Its pages point to the close relationship between electric power and wartime production. They reveal how the industry has geared itself for the tremendous loads that will be imposed upon it if victory is to be achieved. They reflect some of the changes that are occurring and that will occur later as the full impact of the war economy makes itself felt. And they reflect something else as well—the determination of the industry to put everything into this war effort so that each individual may ultimately have a greater sense of security in his job, a greater pride in his country. The pages cannot, however, reveal the effort of the 150 or more men who cooperated in the compilation of the data that is reported. To them the industry is indebted for this extensive interpretation of the meaning and significance of its war effort.

Unrepresentative Government

EVERY treatise on the American form of democratic government emphasizes how the elective representative system truly reflects the will of the people. Few of them mention the degree to which the system at times goes sour. One of such times was the recent denial of a Congressional committee to report favorably a bill to amend the muchly publicized Raker Act which governs San Francisco's grant of water rights in Yosemite National Park. The bill to amend the original grant so as to permit the city to sell by-product power generated on its water system was introduced by two San Francisco Congressmen after the local voters for the eighth time refused to subscribe to a program of municipal ownership of power facilities. One might logically assume that it was the will of the people to continue the highly profitable sale of power at wholesale to the local utility.

However, the members of the Congressional committee must have felt otherwise for they refused to act favorably upon the appeal brought before them by San Francisco's representatives. We wonder how these other gentlemen would feel if their constituents had given them such a mandate as the eighth successive defeat of public ownership implied in this case, only to have a committee of their fellows tell them that their electorate did not know what was good for it. If they had the interests of their constituents at heart, they would say something about such a travesty, and even perhaps do something about it.

Under present circumstances, about the best the people of San Francisco can hope for is a moratorium for the duration. If the experience in the Pacific Northwest with the Boneville public power program can be taken as any criterion, even hope of a moratorium is dim. There the power requirements of the defense effort are being held up as a prime reason for continuation of the program of acquisition of private utility systems. Which is like saying that black is white.

Readjusting Manpower

IN the mobilization of the nation's total resources for war production and participation, disruption of civilian plant facilities is trivial besides the readjustment necessary to manpower. Steps are being taken to change over plant to war production in more or less planned thoroughness, but little or nothing is being done to transfer the

disrupted manpower to its new tasks, except in the filling of the army and navy.

The task of readjusting manpower is comparatively simple in straight mechanical changeover. A plant that used to make washing machines converts its machines and trains its employees to new processes. But nothing is being done about the distributive personnel whose jobs and hence livelihoods are moved out from under them—salesmen, dealers who have to close down for lack of stock to sell, appliance distributors' staffs. Nothing is being done except to let them shift for themselves, if they can, into some sort of war job.

It would be easy to throw this problem, like so many others, into the ample lap of government, and unless the industry takes the initiative that is where it will land. But have we not shifted too many of our business burdens to government, only to find our system gradually socialized and taken over too?

How much better it would be for the industry itself to assume this placement job, to make it serve the present purposes of war production and then of future rehabilitation, than to toss it to government and run the risk of never having it returned. This is a task for the initiative and enterprise we claim. Let us not pass the buck.

Course Charted

TWO statements by J. H. Krug, director of the power branch of the War Production Board, before the winter convention of the AIEE are especially significant. They chart the course of the power industry's war effort for the immediate future at least. And they do not concur with some of the fantastic statements regarding the power situation that have been emanating from the national capital in recent weeks.

Fear that there will be no forewarning of huge war power loads such as might conceivably result in a regional power shortage of the kind that certain politicians have been predicting is allayed in these words:

"We already have for each power supply area in the country a schedule showing the reliable power capacity in relation to the anticipated power loads. The projected loads are being broken down in sufficient detail to permit a realistic comparison of these estimates with the actual results. These figures are under constant scrutiny and the power supply picture for each area will be revised from time to time so that it currently reflects all important developments in the war production program. Each power supplier will be advised of projected war loads for his respective service area. It is already apparent that the power system serving the important industrial areas will have to provide power supply substantially in excess of that normally considered as the reliable capacity."

The job of performance Krug assigns to the industry's engineers and operators as well as to managements. Here is his tribute and challenge:

"Power plants, transmission lines, substations, and distribution facilities will be called upon to carry loads of a magnitude which they have never carried before. Utility management will respond to the test, but management must rely upon its engineers for the knowledge, for the 'know how' of what can be done to minimize the use of materials during this period of emergency. It is as bad to risk too much as to risk too little! Stripped blades in a turbine or a burned-out winding in a transformer at a strategic point could be a serious blow to war industry. On the other hand, idle spare capacity is directly reflected in reduced scope of the war effort. Engineers as a class have established a reputation for ingenuity and power engineers are the most ingenious of all. Whatever talent and experience and skill we have must be called upon to meet the test of this emergency. This is a job for operating men and engineers. Government administrators and the executives of the industry can be helpful. But without the vital knowledge of the men who run the power systems, the task will be hopeless."

This is a challenge that the industry can and will accept.

IF ANYBODY wants to call me over-optimistic and over-enthusiastic about America's power plant, that's their good American right of free speech. But I believe that the hardest boiled cynic, or even the dourest defeatist, confronted with the facts as I have found them, would have to concede that the intelligence, energy and daring of private industry are doing a dynamic job of power production. Here is an industry that was really ready for national defense. Electric power is now driving 86% of the factory wheels of America. And almost nine-tenths of this vast power mechanism was built and operated by private enterprise, seeking an opportunity for profit, in the matchless American Way. In that search were developed new uses and new markets for power, new comforts and standards of living for Americans, at ever higher efficiency and with ever lower cost. Backed by the savings of millions of small investors, private industry has marshalled the peacetime kilowatt forces into an army more than adequate to America's production needs in a wartime emergency.—Lowell Thomas, writing for Johns-Manville.

THE WAR and you

Its latest regulations and restrictions as discussed in two important recent industry meetings — how they affect business and curtail it

Dealers—

PRICE control is now law. Terms will be stiffened still more. Production can be expected to be curtailed much more. Some appliances will no longer be made for the duration. So far no "freezing" of appliance stocks, as automobiles were frozen, is in sight, so do not be scared by such rumors.

In extreme brief such were the latest developments in the appliance situation as revealed to the Western Spring Market of the Western Merchandise Mart, San Francisco at the conference dinner and the western radio and appliance trade dinner by high government officials and by direct information from Washington.

● PRICE CONTROL—Congress passed the price control bill. It put authority behind the Office of Price Administration. Before it could employ control only indirectly through priorities on raw materials. Now, under a single administrator, price ceilings can be fixed and rents too in defense housing areas. OPA has already been delegated authority to ration consumer goods by Donald Nelson.

OPA asks business' cooperation and voluntary effort to hold prices down so that the legal sanctions will not be necessary—but they are there if need be: criminal penalties, injunction, suits for treble damages and even licensing, if worse comes to worse. Present ceilings will be ratified or reissued. Others are to come.

Inflation, while it would create a temporary boom, explained W. I. Robinson, attorney for OPA, would kill all values, destroy savings and insurance, raise the cost of an already costly war, and every citizen would be paying for it for years. Inflation would be a great aid to the enemy, a severe defeat to this nation.

● MORE CURTAILMENT—Refrigerators, ranges, washers, ironers, radios, vacuum cleaners, small appliances, said Robinson, must be expected to be curtailed still more because the expanded war production program needs *all* the metals they require. Economist for OPA Waterson put it more bluntly in respect to manufacturers of small appliances. "They just will not be in business." Certainly direct rationing is coming, if not already here.

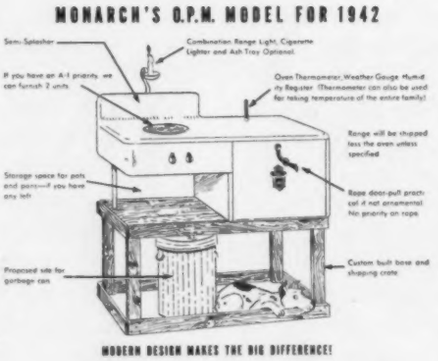
● STIFFER TERMS—Regulation W of the Federal Reserve Board is up for stiffening. Preliminary outline of intended shrinking was read by G. W. Fitch, managing director, Western Furniture Conference. Refrigerator down payments would be upped to 25% from present 20% with 18 months cut to 15 months. Ranges, same 20% down, but 15 months instead of 18. Proposes 12 months for consolidated obligations of more than one appliance etc. instead of 15. Field of articles covered would be widened. No date set yet for the new regulation, but expect it soon.

● NO FREEZING—Autos are in demand by the army, refrigerators are not. Defense housing production may be supplied by fewer manufacturers, others will just be converted to war production and make no more, if it gets that bad, and it may. No freezing is expected, but stoppage of civilian production except for defense housing is a possibility.

● REPLACEMENT PARTS—Manufacture of a limited supply of replacement parts for radio, and also tubes, was expected by David J. Finn, of RCA. Same may be authorized for other appliances. Precedent is the permitted manufacture for auto repairs. War needs for radio equipment are so vast that it may take *all* the production available.

As a Christmas greeting Monarch sent out this amusing poke of fun at OPM

MONARCH'S O.P.M. MODEL FOR 1942


Semi-Splasher
Combination Range Light, Cigarette Lighter and Ash Tray Optional
If you have an A-1 priority, we can furnish 2 units
Oven Thermometer-Weather-Gauge-Humidity Register (Thermometer can also be used for taking temperature of the entire family)
Range will be shipped less the oven unless specified
Storage space for pots and pans—if you have any left
Rope door-pull practical if not ornamental. No priority on rope.
Proposed site for garbage can
Custom built base and shipping crate

MODERN DESIGN MAKES THE BIG DIFFERENCE!

Any further suggestions for Economy will be given due consideration.

—Contractors

● MARGINS UNDER PRICE CONTROL—Asked if a dealer would be permitted to raise prices to meet rising costs of labor and taxes, the only assurance given was that each case would be studied. Control may be on the wholesale price. Profit will be problematical, and overhead costs should be cut. It is evidently expected that dealers will make patriotic sacrifices, not expect profit, nor even normal running expenses. As one man put it, "*Let us take our profit in the regaining of a free world.*"

Contractors

WAR tightened materials for electrical contractors too during the past month, but at least from the big all-day OPM conferences held in the larger cities by a flying squadron of Washington officials, came a few clarifying interpretations. It is now much clearer what a contractor is to do to get materials for (1) housing, (2) major repairs for factories and producers, (3) minor repairs for homes and stores, (4) farm equipment, and (5) for his own tools and equipment.

To go direct to the point, things are being simplified and made more clear. Under the new War Production Board (WPB) which replaces OPM, these same orders apply. First thing every contractor should accept is that *this is a war* and nobody is fooling. The procedure was confusing at first because nobody was in the habit of doing business under such tight regulation. The idea to accept is that "we're in the army now," and that we can take orders and carry them out.

As Jones, who spoke on defense housing, put it realistically, "Any inconvenience or suffering that we are caused by this dislocation is mighty little compared to what our boys are asked to put up with at the front."

● HOUSING—Jones warned of a new order pending which will stop all construction of any kind that is not on priority, that will not even permit completion of houses or buildings under way unless the contractors have actually taken delivery on the materials. Hoarded material will be smoked out by cutting off its market, preventing price increase.

More defense housing, at low cost, admittedly substandard, will be built. especially for rental, in defense areas.

If private capital doesn't, the government must. Metal used in a house will be limited in pounds. For instance a heating system can't exceed 360 lbs., pipes and all. That's a break for electric heat.

● MAJOR REPAIRS—Are now clearly covered in P-100, superseding P-22. Its use is greatly simplified. But the repairs and maintenance must be for what are classed as *producers*. Retail stores are not covered. Neither is an oil station, although an oil producing company is. A contractor is covered for his tools and equipment to repair or maintain the property of any producer as defined. It is *not* to be used for expansion or improvement. That takes a PD-1. Farmers are not covered—they have P-95. Mines have P-56.

Secure from customers entitled to use P-100 the endorsement required: "*Material for maintenance, repair or operating supplies, Rating A-10, under Preference Rating Order P-100, with the terms of which I am familiar,*" and signed by the qualified business or plant. The contractor may accumulate several such orders, (but each must be made up separately), and combine them to purchase replacement materials in minimum commercial quantities.

A motor can be replaced under P-100 if it is a part of an essential machine, such as a lathe, and if beyond economic repair. In that case it might be better to apply under PD-1, stating all the facts and reasons. "Economic repair" is interpreted as costing less than 75% of the original cost to repair.

If the A-10 rating under P-100 is not sufficient to obtain needed material for repairs in a hurry, put in a PD-1 application, and state plainly what steps were taken to purchase, and the reasons for asking for a higher rating. If the end-product is important, it will be given a higher preference. "Do not hesitate to file," said the OPM spokesman. "Nothing is too small to be considered. A motor rewind might be *very* important." PD-1 applications now clear in two weeks if air mailed.

In extreme emergencies wire the WPB office in Washington, giving name of supplier, priority rating needed, specifications of material needed, nature of the emergency. It will be cleared without a PD-1.

PD-1 applications are for use by anyone for any requirements not covered in other orders. A customer can use it, or a dealer or a contractor and if his need is considered really vital, it will be considered. In it the applicant must tell how much of the required material he has or can get on hand, how much more is needed, places he has tried to get it and failed, where he will buy it if he is authorized, what he wants to use it for, and how badly he needs it. Forms are to be filled in quintuplicate, notarized, sent direct to Washington. The answer will come in 10 days to 2 weeks. It has to be *urgent* though, not merely inconvenient to get along without.

● MINOR REPAIR STOCK—A new order M-67 has been issued to permit the contractor and dealer to carry a certain minimum stock of materials and repair parts on hand for small repairs for ordinary consumers without requiring the filing of an application. This will be administered through your jobber, who in turn will be permitted a certain stock to cover your needs. This applies to plumbing, heating and electrical materials only. It restricts total inventory of these materials to 3-12 of the total dollar value of your sales from stock in 1941 (about three month's stock).

● RANGE WIRING—Nothing is provided as yet for wiring in the remaining ranges that may be sold and the OPM specialists had no answer to the questions put to them on the subject. For defense housing the wiring would go under the quota of wire allowed under the special priority for that job. Other range sales will evidently have to be wired from contractors' existing stocks until that is exhausted. A request has been made to WPB to make provision for such wiring but so far no order has been issued.

On a war footing already is C. C. Buford, contractor of Sacramento, with his service and repair shop on wheels

Never has there been a time when it will pay a contractor to work more closely with his jobber than now. Both are so interdependent it can't be emphasized enough. And the contractor who has worked closely with his jobber will get the maximum help from him in these difficult days ahead. New rulings, correct information as to filling of forms and handling of the priority orders and emergency help for the contractor can be relied upon from a good wholesaler.

If a contractor will submit to his jobber information as to his stock each month, how much was sold on priority, how much not, both can help each other. *Contractors must also learn to turn down tempting work for customers who have or can get no priority or their stock will be depleted and they will have sold themselves out of business.*

● TIRES—A contractor's truck comes under the provision of "a truck operated exclusively for one or more of the following purposes: Transportation essential to render electrical repair service or of material and equipment for the construction and maintenance of production facilities, or for the construction of defense housing facilities and military and naval establishments."

● LIKE IT OR NOT—this is a war. The soldier can't help himself to his supplies as he pleases. Business has to stand in line too and be issued its supplies so that there will be enough to go around, and more important, enough to fight the war successfully. Many contractors have disregarded the whole priority scheme because they did not like it or weren't used to doing business that way. The times require change. It is to the best interests of all to take orders and to make the complex and difficult organization work to win against a highly efficient and well organized enemy.

Lighting Committee

Los Angeles County's civilian defense light coordination committee, which supervises the release of lighting information during the emergency, is comprised of members of the electrical industry. Practically all are members of the Illuminating Engineering Society, Southern California section.

The men were appointed to the committee through the efforts of George M. Rankin, Southern California Edison Co. director of lighting, who saw in the circulation of numerous lighting inaccuracies during the first days of the war the need for an official headquarters manned by an informed personnel through which the public could receive accurate information.

Operating under the Los Angeles County civil protection committee, the light coordination committee is headed by Frank A. Hansen, IES regional vice-president. It includes Arthur W. Nye, G. M. Rankin, T. H. Shepherd, B. F. Delanty, Peter Diederich and J. H. McCambridge. Its sub-committees are:

General Staff: **Frank T. Anderson, intensity standards; R. J. Crump, camouflage consultant; Judson M. Hawthorne, photographic consultant; Ernest A. Hutchinson, vision consultant; Eugene C. Burke, light screening methods and materials; R. G. Linderman, searchlight consultant; H. B. May, Jr., street lighting; Alston Rodgers, light sources; John T. Shannon, fluorescent materials.**

LIGHT for a SHOW ROOM

Who

George W. Dunmire, Inc., on superhighway in Oregon City, Ore., near waterfront. Installation and engineering by Montgomery Electric Co., Portland, George Card.

The Need

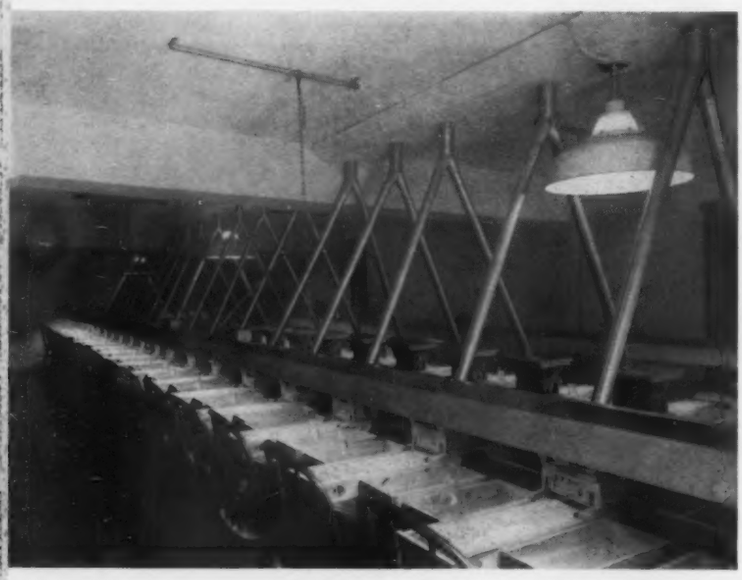
Attention compelling interior and exterior illumination to display automobiles.

Conditions

Showroom 28 ft. wide, 50 ft. long, 12-ft. ceiling, walls pale blue. Circular plate glass window at end.

Installed

Around exterior eaves of front, 81 ft. of single lamp bare F lamps for outline lighting. Also Zeon sign. Interior by 19 Montgomery 4-lamp fluorescent units, daylight and white F lamps, placed end-on in four rows as illustrated for light distribution.



SORTING TABLE

Who

Spokane Seed Co., Spokane. Installation engineered by lighting staff of Washington Water Power Co.

The Need

High intensity and yet cool light for critical seeing in sorting and selecting of peas for seeding purposes.

Installed

Two rows of troughing containing continuous strip of 40-watt F daylight lamps 12 in. from the sorting table. Produces 200 ft. candles on the sorting belt. Troughing suspended by chains. General lighting from RLM incandescent reflectors.

Who

First Federal Savings & Loan Co., Spokane. Engineering by Ladner Ross, Washington Water Power Co.

BANKING OFFICE

The Need

Adequate yet inconspicuous illumination in a banking office and especially at counters along which business is transacted and desks are placed.

Conditions

An L-shaped room of 3,300 sq. ft. with 16-ft. ceiling, light colored walls and ceiling.

Installed

Two rows of 40-watt white F lamps in an indirect cove, a total of 214 40-watt lamps, 16 15-watt lamps. One row in a reverse cove on side opposite counter.

Results

Illumination 40 ft. candles in the general area, 35 ft. candles in the lobby area.

EMEA *Dope Sheet* — *Edited by Howard C. Park*
EMEA of So. Calif.

Fuses for Overload Protection--2

Renewable types discussed; what the Maintenance Engineer should know about them told briefly

Renewable cartridge fuses are so constructed that their fuse link may be readily renewed when the link is blown. Renewable fuses do not have powder or other material to quench the arc, but depend on the quality of tube fibre to withstand the destructive effects of blowing fuses. Consequently, the quality of tube fibre is an important factor in renewable fuses.

In ferrule type renewable fuses the fuse link is inserted through openings at the ends of the tube and held in place by pressure of the cap. Except for quality of materials used, and ease of assembly, there is little difference in the various makes of ferrule type fuses.

In knife blade type renewable fuses the fuse link is bolted to the portion of the blade which extends into the tube. The important features of this type of fuse are: size and quality of copper blade, bolts for securing links of non-magnetizing material, and access to inside of tube.

Fuse Links

The function of all types of fuse links is the same. The "blowing" of the link depends on the melting point and cross-sectional area of the metal, the intensity and time of current flow, and facilities for dissipating heat in the link.

Overload Ratings

Standard fuses will carry 10% overload at 24° Centigrade.

They must blow at 150% over-load in ambient temperatures of 18 to 32° C. as follows:

Fuse amp. rating	Max.time to blow
0— 30	1 minute
31— 60	2 "
61—100	4 "
101—200	6 "
201—400	12 "
401—600	15 "

Renewable Links

Renewable fuse links are made in patterns consisting of broad hexagonal areas joined together by small connecting strips. The principle of this construction is that the thermal areas will dissipate the heat generated in the slender connecting strips. Since heat dissipation is governed by time, the possible duration of over-load is also governed by time.

The *non-lag* or *drop-out* link is almost standard in design. The links are of rather thin metal. For this reason their heat dissipation is limited. Therefore, they do not possess time-delay when overloaded.

The *lag* or *time-delay* links vary considerably in their pattern design and construction. The lag links are quite thick. Some brands are constructed of as many as 22 different pieces of metal spot welded together, while others are made of one piece of metal. The time-delay action of this type of link is attained by the increased heat dissipation in the thermal areas.

On *short-circuits* both types will blow at about the same time interval.

On *over-loads*, the lag-link will take about twice as long to blow as the non-lag, or, it will carry approximately $1/1^2$ more current for the same length of time.

Each type of link has its definite application, depending on the nature of the load and type of equipment to be protected.

Non-lag links may provide protection for non-fluctuating and very light starting current loads, while lag-links may provide ample protection and reduce operating losses on equipment with fluctuating and heavy starting currents.

Fuse Maintenance

If a properly applied fuse blows—*something is wrong.* The cause should be located and the condition corrected. To increase fuse capacity will only invite trouble.

1—Fuse amperage should be a low as possible to protect conductors and equipment served.
2—Other materials should never be substituted for standard fuse links.
3—More than one fuse link should not be used in a fuse.
4—Fuse link connections should always be clean and tight.
5—Fuse links should not be sharply bent.
6—Magnetizable bolts should not be used for securing fuse links.
7—Ferrules or blades should have full and tight contact with clips.
8—Fuse barrel should be cleaned after each fuse blow.

Blown Links Tell the Story

Properly designed fuse links, almost invariably, will show what caused the fuse to blow.

Link Blown at Both Ends. When this occurs, look for a short-circuit or extremely heavy overload of about 1000%. Under this condition the heat builds up so fast that the thermal areas cannot dissipate the heat rapidly enough, so the link blows simultaneously at both ends, permitting the entire center of the link to drop out.

Link Blown Only at One End. Indicates poor contact on end, adjacent to blown link. Look for loose fuse link connection, loose or poor clip contact, loose lug or wire, or bad switch contact. The added heat conducted from bad contact will cause link to become more heated on closest end and blow.

Link Blown at Center Connection. Caused by medium overload. In cases of prolonged overloads the central part of the link cannot radiate or dissipate as much heat as the portions closer to the ends, which have more air and the metal ends to dissipate the heat.

Links Blown at More Than One Center Connection. Caused by heavy overload or repeated overloads. In cases of heavy overloads the heat is generated rapidly enough to prevent the ends of the link from having any advantage by heat dissipation.

The intensity of overload can not be as accurately determined in the 250-volt link. The 600-volt link will produce more definite point of blow.

Fuse Selection

Ease of maintenance and dependability of performance should be the determining factors in fuse selection.

Determining Factors

1—Accuracy of performance.
2—Simplicity of changing links.
3—Access to inside of fuse barrel.
4—Quantity and quality of metal used.
5—Quality of fibre used.

Secretary L. A. Jacobson and President Warren James of EMEA of No. Calif. At a meeting Jan. 22, first since the blackouts, Walter C. Smith of General Electric Co. was the speaker. On Feb. 26, air conditioning will be the topic

PCEA Panorama

Edited by Mary Shoop

Electriquiz

1. Must interior lights be turned off during a blackout?
2. Is it cheaper to feed poultry cod liver oil or to irradiate them with sun lamps?
3. What new uses of portable sources of black light are being made?
4. Is fluorescent lighting a development of recent years?
5. What's new in the domestic sun lamp field?
6. What western utility company includes an area in Mexico in its service territory?
7. What percentage of irons are automatic—20%, 45%, 80%?
8. Which took the heavier toll of life in 1940: Nazi air raids in England or automobile accidents in the United States?
9. When is 12 larger than 14?
10. What happened to 13?

The answers are on page 100.

Essay Contest—

Winners to get free trip to PCEA Convention

Would you like to attend the annual PCEA convention with all expenses paid? Then enter the Richard E. Smith Memorial Award essay contest. You may be one of the winners of a free trip to the convention, which will be held in May at the Fairmont Hotel, San Francisco.

"I Like My Job in the Electrical Industry Because . . . ." is the subject of the competition. Your completion of this idea is limited to 150 words. Your entry must be in the San Francisco or Los Angeles office of PCEA by April 15.

The contest is open to all employees of Class "A" members of PCEA. with the exception of officers and department heads. Class "A" members are companies belonging to the association. If your company is a member, you are eligible for the contest, regardless of whether or not you hold personal membership. Tell your non-member friends about this and invite them to compete.

The company whose employees make the best showing in the contest will be presented with a gold cup at the convention. This perpetual trophy will be held by the winning company until next year, when it will be passed on to the next top ranking organization. The cup was a part of a PCEA essay contest held some years ago and is being incorporated into the present competition.

Judges will be A. C. Joy, advertising manager, PG and E, chairman; W. A. Cyr, associate editor, ELECTRICAL WEST, and Miss Agnes Barrell, advertising counselor, Northern California Electrical Bureau. They will judge entries on composition, logic, originality and value of ideas. Don't bother to bind your entry elaborately or decorate it. It will have no effect upon the judges' decision.

Your name must not appear on the entry. Your name, company affiliation and address should be written on a separate piece of paper, enclosed in a sealed envelope and attached to your essay.

A fund of $300 has been appropriated by the board of directors to send a minimum of five contest winners to the convention with all expenses paid. The judges will select the 12 best entries, and as many of these will go to the convention as can be provided for within the amount. Last year nine men and women enjoyed the convention as contest winner-guests of the association.

This is PCEA's second annual essay contest designed to make it possible for more people to attend the convention. It is named in honor of the late Richard E. Smith of Los Angeles, long prominent in PCEA affairs and a director of the association at the time of his death.

Cities Adopt Code

PCEA's continuous field efforts have resulted in the adoption of the 1941 edition of the Uniform Electric Code by Pomona, Sierra Madre, Blythe and Corona, Calif. These progressive cities are the first to adopt the revised and improved 1941 edition of the code, while a number of other municipalities now considering it are expected to embrace its modern standards in the near future.

Information Group Meets

Forging ahead with plans for a number of activities of industry-wide interest, the PCEA industry information committee met in Los Angeles on Jan. 15 under the gavel of its chairman, M. W. Phillips, Southern California Edison Co., Visalia. Eleven members from various parts of the state were present.

Next fall's PCEA district meetings and the Richard E. Smith Memorial Award essay contest were the main business of the day. A schedule of dates and

Who Am I?

I was born on a farm near Howard, Kansas, in 1893. After public school preparatory work, I specialized in economics and law at the University of Michigan, graduating with A. B. and J. D. degrees. In 1916 I began the practice of law in Winfield, Kansas, and the next year became assistant counsel for the United States Food Administration in Washington. In 1918 I enlisted as a flying cadet in the United States Air Service. Who am I?

After the war I served as liquidator for the Food Administration and spent a year in American relief work in Central Europe. In 1922 and 1923 I was assistant to Herbert Hoover, Secretary of Commerce. In 1924 I came to Los Angeles to join the law firm of Fredericks & Hanna. Who am I?

My initial association with the electrical industry came in 1925, when I was engaged as special counsel for the Southern California Edison Co. I became a vice-president in 1930, and the following year was appointed executive vice-president, the position I hold today. Recently the Stanford Press published my book entitled *History of the United States Food Administration*. Who am I?

I have been active in Chamber of Commerce affairs for a number of years. I have served as a vice-president of the United States Chamber of Commerce and at present am a director of the California State Chamber of Commerce and a vice-president of the Los Angeles Chamber of Commerce. I am a trustee of the Mutual Life Insurance Co. of New York, a member of the American and California State Bar Assns. and a director and past president of the Pacific Coast Electrical Assn. I am affiliated with Alpha Sigma Phi and Phi Alpha Delta fraternities, as well as with the University and California clubs. I am married, have two daughters, and my name is:See page 100.

places generally paralleling that of 1941 is planned for this year's district meetings, which will incorporate several improvements designed to make them even more interesting than their successful predecessors. Because the meetings will be keyed closely to the changes and new problems in today's business structure, they are expected to be of more value to those attending than any series in the past.

Ordinance Clarified

Regulations governing the enforcement of the sub-standard appliance sales ordinance of the city of Los Angeles were voted recently by the board of building and safety commissioners. Arthur Kempston, PCEA field representative, assisted in drafting the rules.

The action increases the number of field inspectors assigned to enforcing the ordinance, and clarifies several points upon which there has been confusion in the past. The ordinance prohibits the sale of any electrical appliance, device or equipment which does not conform to the recognized standards of safety for life and property as established by the Underwriters Laboratories and approved by the American Bureau of Standards.

EMEA Meet

"Plant distribution systems and associated equipment" was the subject at the Jan. 20 meeting of the Electrical Maintenance Engineers' Assn. of Southern California. Mario S. Ajello, Los Angeles switchgear specialist of Westinghouse Electric & Mfg. Co., assisted by H. B. Summers, presented the program.

The meeting was also the annual meeting for election of officers. Howard C. Park, of General Motors and chairman of the "dope sheet" committee for several years, was elected president to succeed Glenn Farr, RKO Studios, Inc. Walter P. Ritter, American Can Co., was elected vice president. The secretary-treasurer is to be appointed by the new president. To the executive committee were elected Harry Simpson and Walter A. Smoker. Oliver Anderson, Santa Monica Technical School, was re-elected. The new appointees for a two year term replace Jerry Ellis, Knudsen Creamery Co., and Warren W. Starkey, E. K. Wood Lumber Co.

Committee chairmen appointed are: *dope sheets*, R. P. Yachik, Shell Oil Co.; *social*, H. A. Simpson; *editorial*, H. R. Sedgwick, Safeway Stores; *educational*, O. V. Anderson; *liaison*, Glenn Farr; *membership*, W. A. Smoker; and *program*, W. P. Ritter, American Can Co., and H. M. Shabbleman, Richfield Oil Co.

Changes in the constitution raised the active dues from $1 to $2 per year. With the January meeting notice went a statement of policy declaring the EMEA an independent organization not sponsored by any other organizational group. Its purposes are to promote friendship, to provide educational lectures and demonstrations, to conduct an annual display of new equipment and processes. Services rendered active members include monthly "dope sheets" giving electrical data, etc., a question box department, information as to availability of special tools and equipment, night school classes sponsored by the association in cooperation with Los Angeles schools and employment service. Associate members, made up of manufacturers and agents, have privileges of presenting educational programs to the membership, displaying and advertising equipment at the exposition, listing of tools and equipment and processes available and a mailing list and mail service to members.

Blackout Rules Cited

"The lighting engineer's place in civilian defense" was discussed frankly by Major H. S. Osborne, Signal Corps, U. S. Army, loaned to the Regional Director, Office of Civilian Defense, for the Ninth Corps area at a monthly meeting of the San Francisco Bay Cities Section of the IES, Jan. 14. Exterior lighting from blackout type of lighting units, he declared, would not be permitted until a standardization of fittings had been achieved and equipment considered safe by the Army has been approved. Vehicular lighting, for authorized vehicles only, would likewise be permitted only when standardization had been worked out. The problem is complicated by the fact that various states have separate motor vehicle departments and laws. Because of the division of authority and local responsibility, authorization of exterior lighting will come through local authorities, if at all.

Announced at the meeting was the resumption of the second part of the IES lighting schools running concurrently in Sacramento and San Francisco. The second part of the course deals with applications of lighting. The course is under supervision of chairman of the educational committee, John Walsh. Meetings are held Friday nights in Sacramento and Monday nights in San Francisco, at the Western Furniture Mart.

IES Offers Services

Services of illumination specialists have been offered the defense organizations of Washington by Washington State Chapter of the Illuminating Engineering Society. George M. Boyd, chairman, made the offer directly to Governor Langley and it was accepted immediately. In making the offer, Boyd recalled that the previous year's chairman, E. T. Bakeman, was already functioning as technical advisor on lighting control for the First District Emergency Defense Commission, and that national headquarters of IES had offered its facilities to the Office of Civilian Defense.

Function the IES could perform, Boyd stated, was the establishment of a technical and advisory committee on lighting control for blackouts and obscurity. This committee could prepare technical reports on current problems involving blackouts, act as a connecting medium between IES research and local problems, and develop long range plans for submission to state councils of defense and the Army.

The Jan. 12 meeting was held at the Engineers Club in Seattle. At it Capt. D. B. Brummel, representing Second Interceptor Command, discussed "Problems and requirements of obscurity from air observation." Major W. W. Williver, representing Washington State Defense Council, discussed "Problems of essential operations during blackouts, including traffic, war production, civilian business and morale." C. T. Bakeman presented "Technical developments in research on lighting control for blackouts."

● Ed White, manager of Lowe's, Inc., was elected chairman of the Ogden division of the Electrical League of Utah at the annual meeting held Jan. 19. He succeeds Reed Smith, who automatically becomes vice-president and a member of the league's 1942 Board of Trustees. A. N. Vendall was renamed secretary.

Appearing on the program were G. Wayne Stillman, president, E. J. Duggan, vice-president and Elias J. Strong, manager of the Electrical League of Utah, who presented talks and reports of 1941 operations.

● The Electrical Contractors and Dealers Ass'n. of Sacramento, Inc., elected the following officers for 1942 at its annual meeting on Jan. 13: J. W. Thomas, president; F. R. Merwin, vice-president; C. C. Buford, secretary; W. E. Camp, treasurer; Sam Bisset, E. L. French and C. Stewart Donley, directors. French is retiring president.

Rocky Mountain Chapter, Western Section IAEI, will hold its annual meeting Mar. 26-27 at Denver. A code discussion and election of officers will be on the program.

Utah Chapter, IAEI, paid respects to Blaine Grey, former Salt Lake City electrical inspector, at its meeting Jan. 20. Grey is a former chairman of the Utah chapter and president of the northwestern section of IAEI.

NEWS of the industry

ICKES OPPOSES MOVE TO DROP ACQUISITION SUIT

Decision of the City of Bremerton and the Kitsap County, Wash., PUD to suspend condemnation suits against Puget Sound Power & Light Co. for "the duration" met opposition from Secretary of the Interior Harold Ickes, who advised the PUD commissioners that he saw "no reason to discontinue efforts to effect acquisition" of the company's properties.

Following the Ickes' communication, E. K. Vaa, PUD commissioner, announced that the commissioners had adopted a resolution stating the district's wartime policy would be "in conformity with the policy of the United States government."

In recommending the armistice, the Bremerton city commissioners pointed out that a conflict between local groups over acquisition of the private power company's system, or construction of a substitute plant, seemed a waste of time and energy when "we ought to use all our energy and united efforts to win this war at the earliest possible date."

Both the city and the PUD have started acquisition proceedings against Puget Sound and are disputing which group would take over the company's Bremerton properties.

Raker Act Amendment Killed By Public Lands Committee

"No" was the only answer given when opponents and proponents of an amendment to the Raker Act permitting San Francisco legally to sell power from its Hetch Hetchy water supply system, had their innings before the House Public Lands Committee in Washington last month. Occasion was a series of hearings on an amendment to the original congressional grant introduced after San Francisco voters turned thumbs down on municipal power distribution last November for the eighth time.

City officials, including two supervisors, two engineers, the chairman of the public utilities commission and a legal representative, presented a strong case based upon the electorate's repeated refusal to sanction public ownership and the fact that San Francisco is denied power sales rights enjoyed by other government agencies, including the Department of the Interior. Secretary Ickes has been the one who insisted that suit be brought against San Francisco for violation of the Raker Act. During the taking of testimony there were several heated exchanges between committee members and witnesses.

Opposition to the amendment included a telegram from California's Governor Olson, an ardent public power advocate and direct testimony by Franck C. Havenner. a member of the California State Railroad Commission and a former Congressman. He urged that Congress demand that the city hold another election on the question of building or purchasing an electric distribution system. A letter from President Roosevelt to the committee chairman also expressed opposition. Final witness to testify against the amendment was Secretary Ickes, who expressed views similar to those advanced when he campaigned in San Francisco last November in favor of the $66,500,000 bond issue that was voted down.

Meanwhile there is pending a federal court injunction against the city's further sale of power to the Pacific Gas and Electric Co. which becomes effective June 30, 1942.

Lighting Restrictions Tightened in Seattle

New regulations tightening restrictions on lighting of Seattle business establishments have been announced by Chief of Police Herbert D. Kimsey. The order provides that when necessary the chief of police can make rules and regulations concerning blackouts in addition to those prescribed in the ordinance and that these will have the force and effect of law until repealed by the city council.

The new regulations limit the size of Neon signs extending over sidewalks; provide that flasher and bulb signs more than six feet long or square shall be out unless they are in the window or flat against the building. All bright floodlights must be out except those necessary to night work in plants or factories.

No Neon or other lights outlining a building or roof will be allowed and lighting that brightly illuminates surrounding street area must be reduced. All large advertising signboards must be darkened from sunset to sunrise. Where lighted signs or lighted areas are covered from above and the surrounding area is not illuminated excessively, they may be permitted to burn.

RAVER SEEKING PURCHASE OF NORTHWEST UTILITIES

A new scheme for government acquisition of private utility companies of the Pacific Northwest filtered out to the West coast from New York and appeared in Portland, Ore., papers Jan. 25. According to this report, Dr. Paul J. Raver, Bonneville Administrator, then in New York, was negotiating for the purchase of Puget Sound Power & Light Co., Seattle, and Pacific Power & Light Co. and Northwestern Electric Co., Portland, with the owners of these corporations, through the purchase of the common stock held by these owners. Indications were that financing would be either by RFC or private bankers.

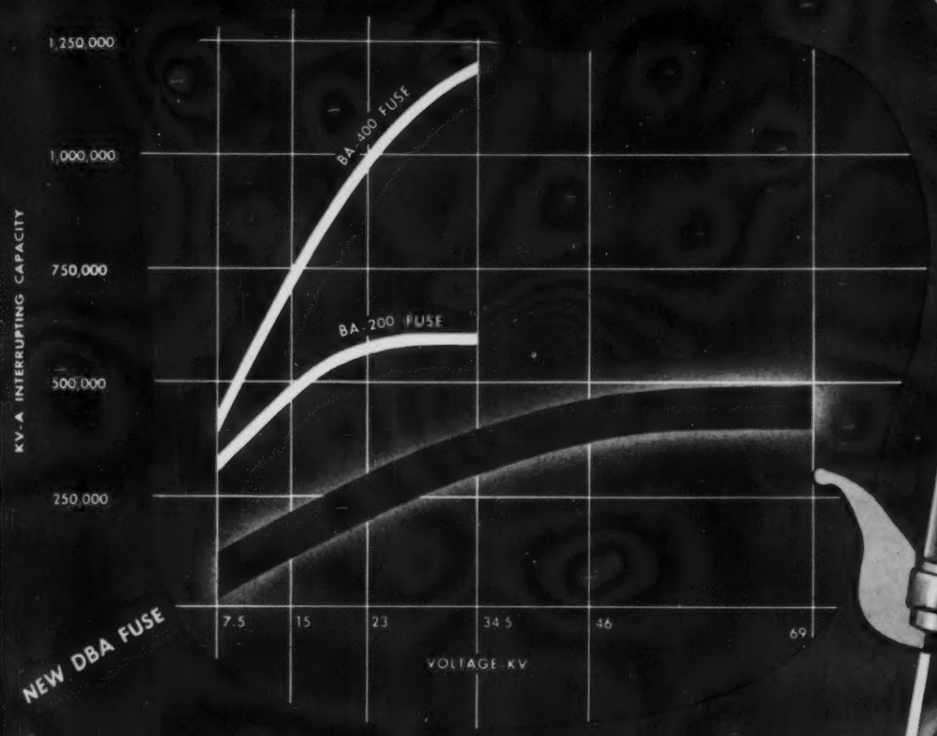
It was pointed out that neither the Bonneville Administration, nor any other governmental agency at the present time, has authority to acquire these power systems; hence the assumption that some form of federally-controlled, public cooperative would be formed to take title to these companies' properties, subsequently selling out portions of them to PUD's, municipalities or other public bodies for the distribution of power within the jurisdictions of those bodies. This idea is not new. It has been proposed and promoted repeatedly during the past two years by John Nuveen & Co., Hartley Rogers & Co., investment bankers, R. W. Beck, James I. Metcalf & Associates, engineers, and Guy Myers, fiscal agent. Such a method of financing acquisition of power systems as a means of putting the PUD's into busines was denounced as too costly by Dr. Raver at the time it was last proposed for purchase of Pacific Co.

Commenting on the report, Jan. 26, Paul B. McKee, president, Pacific Power & Light Co., Portland, said: "Reported efforts of Bonneville Administrator Raver to promote some kind of a 'super corporation' to buy out our properties will not be permitted to divert our energies from the really important wartime job of supplying electric service to more than 125,000 users.

"My own frank opinion is that any scheme which would upset experienced and efficient public service organizations at this time is wholly contrary to the national interest.

"Certainly a trade in ownership of the electric systems of the Pacific Northwest isn't going to supply more planes and ammunition to General MacArthur's besieged troops, because it won't add a single pole or piece of wire to what is already here."

NOW you can get boric acid power fuses up to 69 kv!



new DBA...a low-cost power fuse for systems of moderate capacity

The new DBA fuse extends Boric Acid "De-ion" fuse advantages to higher voltage ratings. At the same time it lowers the cost of short circuit protection for systems of moderate capacity. It also incorporates a new exclusive Westinghouse feature: *positive drop-out action initiated AFTER fault current is interrupted.*

This means no arcing between the end of the fuse tube and the fuse tube clips. No burning of contacts!

Result—lower fuse maintenance.

Added to this exclusive feature is the use of R·I·P (radio-interference-proof) porcelain for insulators.

DBA power fuses are available in voltage ratings from 7.5 kv to 69 kv, current ratings from ½N to 150N amperes, interrupting ratings* from 8500 amperes at 2300 volts to 4000 amperes at 66000 volts.

Your nearest Westinghouse office has complete application data covering this development.

J-60486

advantages of boric acid drop-out fuses

1. Drop-out action initiated after interruption.
2. Complete hookstick operation.
3. Sleet hood over latch mechanism.
4. "De-ion" action of fuse tube.
5. Low-cost Replacement Fuse Unit.
6. Positive circuit clearance.

*Interrupting ratings are R.M.S. amperes first half cycle including d-c component.

Westinghouse

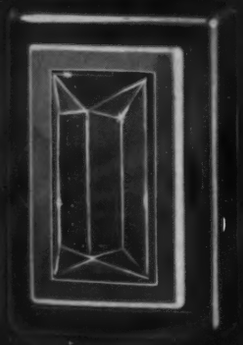
IMPROVED SWITCHGEAR DEVICES PROVIDE

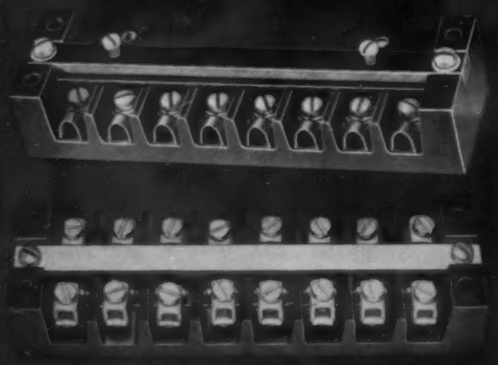
easier operation

SILVER CONTACTS are standard on Type W Instrument and Control Switches. Thousands of units in operation prove that wiping action keeps contacts clean, reducing maintenance to practically zero. Simple, sturdy design makes every part of switch readily accessible for inspection.

MODERN SWITCH HANDLES carry out trends in artistic designs. Wide variety of shapes and colors for circuit identification or other application requirements.

SEEN FROM ANY ANGLE. Extreme wide-angle visibility of the new Minalite lamp permits positive indication from any position in front of board. New low-drain bulb consumes minimum watts.





RUGGED TERMINAL BLOCKS include high pressure or light-duty terminal connectors—reversible black and white marking strips. Available in brown molded Micarta or black molded plastic.

Westinghouse

Long experience in building all types of Electrical Equipment enables Westinghouse to standardize practically all construction details in a complete line of devices. When you buy devices manufactured by one who is also a user like yourself you get the maximum in modern engineering, usability, ease of maintenance and operation.

The devices illustrated are only a few of those that go into Westinghouse equipment. Versatile in application, they fit into any make of apparatus. Some features are the direct result of suggestions made to Westinghouse engineers by operators of switching equipment. Attention to detail reflects the thorough engineering which goes into every device.

For complete information, call your Westinghouse office or write to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N. J-60488

WESTINGHOUSE

RUNAWAY BALLOON PLAYS HAVOC IN SEATTLE AREA

A runaway captive balloon which broke loose from its moorings at Camp Lewis, near Tacoma, Wash., on Jan. 12, struck a high voltage transmission line, causing a serious power failure in Seattle and vicinity. The drifting balloon trailed a length of steel cable across transmission lines north of Seattle, putting both the City of Seattle's Light Department and the Puget Sound Power & Light Co's. lines out of commission. In Seattle industrial and residential areas went without power; radio stations were silent; trackless trolleys were stalled; heat went off in many office buildings and homes. Clocks and teletype machines stopped.

The huge Fremont Bridge was suspended in mid-air, and business buildings and store elevators were stalled between floors.

Fear of an air-raid developed in the city and telephone switchboards were swamped with calls. Fourth Army Headquarters explained that several Army captive balloons broke loose when a sudden gust of wind tore them away from their moorings, but that all but one were immediately recaptured.

Utility Heads Chart Wartime Course At Portland Conclave

Looking toward the general strengthening of the power resources in the five states of the Pacific Northwest under war conditions now being faced, the heads of nine of the larger companies in the inter-connected power grid in the region met in Portland Dec. 29. As a result of this conference, any war emergency will find the companies organized to give each other prompt aid in the form of power supply, equipment or construction and repair crews.

Plans for extending the existing power interchange and mutual assistance program to include the Bonneville-Coulee system were among important topics considered at the meeting. Dr. Paul J. Raver, Bonneville Administrator, assured representatives of the group that his organization would work actively toward the full co-ordination of resources and facilities to back up the nation's all-out war effort.

Engineers have estimated that 100,000 kw. of effective capacity can be gained from existing installations through the complete pooling of private, municipal and federal power in the region.

Steps were also taken to bring into the general program for mutual protection against war hazards, the city light departments of Seattle, Tacoma, Eugene and other substantial municipal power enterprises in the several states. The plan contemplates inventorying manpower, transportation equipment, such as trucks and cars, and surplus supplies of materials and apparatus kept on hand for repairs, so that each operating unit may know promptly the possible sources for securing aid in the event of serious emergency on its system.

The meeting developed that among the 10,000 larger industrial customers on the 16,000 mi. of transmission lines forming the main arteries of the interconnected grid are many engaged in the production of war materials, and scores of airports, army camps and other defense establishments. Largest use made of the 8,000,000,000 kwh. produced annually by these interconnected companies is for the production and recovery of war needed metals, including copper, zinc, lead, antimony, vanadium, cadmium and chrome. Largest single power users are among the nation's biggest copper producers in Montana and Utah. The meeting pointed out that the eleven companies combined had an army of 13,000 trained employees and a fleet of nearly 2000 motor vehicles.

● ALL STORE SIGNS and window lights in downtown business districts of Tacoma, Wash., will go out when the stores are closed to shoppers for the day, retail merchants have announced. Planned for "the duration" the move is an effort to cooperate with military orders that all stores and buildings must be able to blackout within 60 seconds after an air-raid alarm.

● THERE WILL BE NO POWER SHORTAGE in the area served by Seattle City Light, despite increased demands incident to the war, P. C. Spowart, sales manager, declared recently. Spowart, who paid tribute to the late J. D. Ross, also disclosed that more than 10,000 City Light residential customers have complied with the all-electric home requirements entitling them to the system's all-electric rate.

● A $2,024,000 RATE CUT under consideration for the City of Los Angeles was dropped Jan. 8, following approval by the City Council of a recommendation that the matter be filed. In rescinding the proposed reduction, the Water and Power Commissioners stated that reduced revenues and increased expenses due to war conditions made the action necessary.

● TRIAL DATE for the Electrical Contractors Assn. of San Francisco, et al. on anti-trust charges has been again postponed to March 24, 1942.

IN EMERGENCIES, TOO, YOU CAN PUT YOUR TRUST IN

KLEINS

Since 1857

WHEN winter winds howl and there's ice on the lines! America relies on the man with the safety belt and climbers to keep power surging through lines—to keep messages humming over singing wires.

How important to his safety his equipment is, only he knows. His reliance on Kleins is an adequate testimonial to his realization that when life is at stake, only the best is good enough.

Your copy of the Klein Pocket Tool Guide will be sent on request.

ASK YOUR SUPPLIER

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Remove, Reverse or Replace this point
Chance Pike
Poles save on replacement
There is no need to buy a complete new pole when the point becomes worn. The point on Chance Pike Poles may be removed and replaced with a new point.
For extra safety in handling and carrying on the truck this point may be reversed. Lacquer finish poles are steel reinforced at head and butt.

Try this on your trimmer • •
TIPS TOOLS
TIPS TREE TRIMMERS can take it—
It takes a good hefty tree trimmer to cut a 1¼" seasoned insulator pin in two. You get that extra "heft" in a Tips rope operated tree trimmer—you also get a means for attaching a Tips pruning saw for the big limbs, and a means for splicing on additional pole lengths.
Poles are solid spruce, treated with three coats of preservative and voltage tested.
Rope or lever operated types available.
A·B·CHANCE CO·
CENTRALIA MISSOURI

JUDGE RULES FOR TRANSIT COMPANY IN DAMAGE SUIT

In a memorandum opinion made public in Spokane, Dec. 31, Federal Judge Lewis B. Schwellenbach held that the Big Bend Transit Co. had power site rights on its narrows lands on the Spokane River, near where it flows into the Columbia River.

The decision—which upheld the defense in every particular — ended the first phase of the government's condemnation suit against the company for property inundated by the backwaters of the Grand Coulee Dam.

Although it is expected United States District Attorney Keith will appeal, the question of the amount of the damages will first be submitted to a jury in Spokane, probably in February.

The government, contending the company had no legal rights to the north shore lands nor to the water's flow or power site value of any lands, set a value of $32,073 on lands on the south bank of the river. This value was given it only as agricultural land.

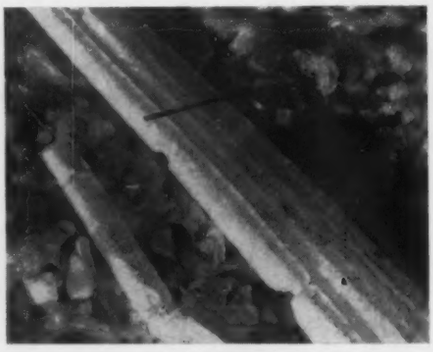
Judge Schwellenbach ruled the company had acquired rights to the power site from the Secretary of Interior under the act of congress of March 3, 1905, and that the Power Act of 1920 had not voided those rights. "I am firmly convinced," the decision read, "that the power act did not repeal the act of 1905 and that under section 23 of the act all of the rights (of the company) were retained."

Many Power Lines Down As "Silver Thaw" Grips Oregon

One of the worst "silver thaws" experienced in western Oregon in many years played havoc with overhead power lines in the Portland area during the middle of January. The Gresham territory, east of Portland, and the Salem territory, 50 miles to the south, were hardest hit.

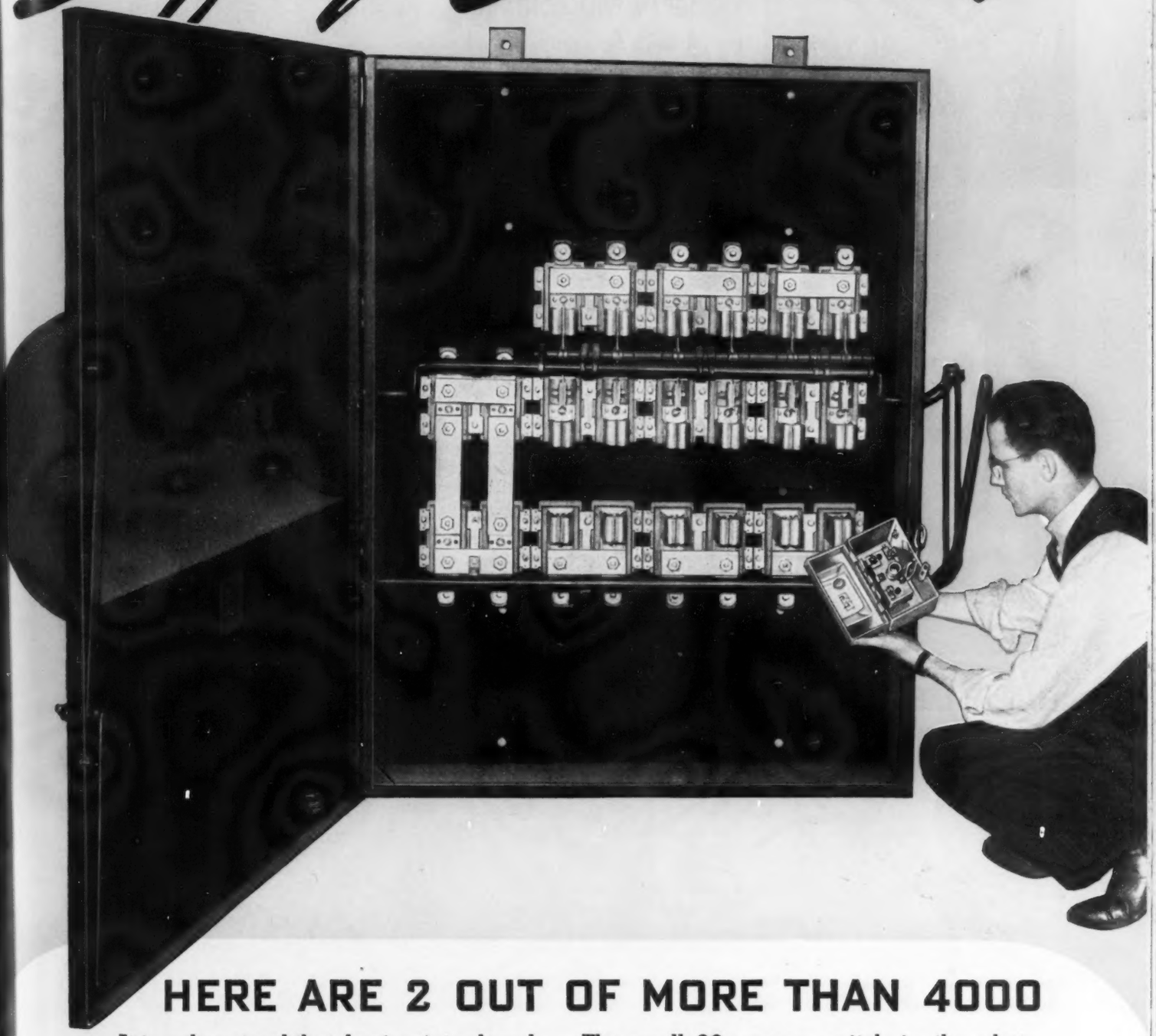
Crews were kept busy day and night for several days resetting poles and repairing breaks in conductors caused by the heavy weight of ice. Some individual lines had to be repaired repeatedly since the icing condition lasted in some areas for two weeks.

Companies most affected by the storm were Portland General Electric Co. and Northwestern Electric Co., Portland, and Mountain States Power Co., Albany.



Oregon's recent "silver thaw" played havoc with PGE lines near Gresham. A coating of ice more than two inches thick built up rapidly on conductors

Safety Switches?



HERE ARE 2 OUT OF MORE THAN 4000

It is only natural that, having introduced the safety-enclosed switch, Square D should continue to maintain its leadership by providing a line which meets all specifications. But would you have guessed that Square D has accomplished that job to the tune of more than 4000 different styles and variations?

The small 30 ampere switch in the photograph weighs four pounds. The large one, 1200 amperes, tips the scales at 725. Actually, these are neither the largest nor the smallest, but they typify the exceedingly wide range of Square D switches—in size, type and style of enclosure.

CALL IN A SQUARE D MAN

SQUARE D COMPANY

LOS ANGELES - DETROIT - MILWAUKEE

KOLLSMAN INSTRUMENT DIVISION, ELMHURST, NEW YORK

IN CANADA: SQUARE D COMPANY (CANADA) LIMITED, TORONTO, ONTARIO

modernize
YOUR
DISTRIBUTION
PRACTICE—

RELIABLE INSULATED
STRAIGHTLINE
SPLICE

A neat and convenient means of breaking the line for series street lighting, for secondary banking, for sectionalizing. Will develop full line wire strength and may be installed on existing construction without splicing in an extra length of wire.

Insulating section is a tough and strong plastic with high dielectric strength which will not carbonize nor absorb moisture.

Reliable
ELECTRIC COMPANY
OVER 30 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE • CHICAGO, ILLINOIS

RAVER SAYS PUBLIC POWER PROGRAM WILL CONTINUE

Proposals from utility executives that the wartime power effort in the Pacific Northwest could be strengthened by interconnections between federal and private systems were ignored by Bonneville Administrator Paul D. Raver in a public statement issued in January just before he left for Washington. Dr. Raver at that time also asserted that the program for public acquisition of private utility facilities would be pressed despite the war.

Purpose of the eastern trip was to place before OPM the Bonneville-Coulee 1942 power production schedule. An additional 180,000 kw. of power can be made available for war industries by the end of 1942, over and above present Bonneville contracts and commitments for 570,000 kw.

With respect to interconnection problems involved in region-wide deliveries of large blocks of industrial power, Raver said that the major part of the power administration's interconnection program had been completed months ago when interconnection with all the major public operations of the Northwest was effected. Any additional connection made would be a matter of minor importance so far as their effectiveness was concerned, and inconsequential in comparison to those connections already in existence, he added.

At present, Raver said there was no power shortage and no power emergency in the Pacific Northwest, but that it was possible one might develop during the late summer and fall of 1942 and that some additional connections might become necessary to insure continued service.

Outbreak of war, Raver asserted, had caused the Bonneville Power administration to reappraise the course of action to be taken in connection with certain negotiations for acquisition of private utility systems by the power administration and public power agencies. He said that after careful study it was the conclusion of the power administration that certain acquisitions would expedite the speedy development of power supplies for national defense purposes, and these would be pressed.

Such acquisitions as these, he declared, would make possible immediate expansion of generating facilities which otherwise would not be enlarged because of inability or reluctance of the private companies to undertake new construction.

"We have assurances that all such acquisitions as these can be financed with private capital or through the Reconstruction Finance Corporation, and we are expecting to continue without interruption negotiations for the purchase, financing and conveyance of these properties," Raver said.

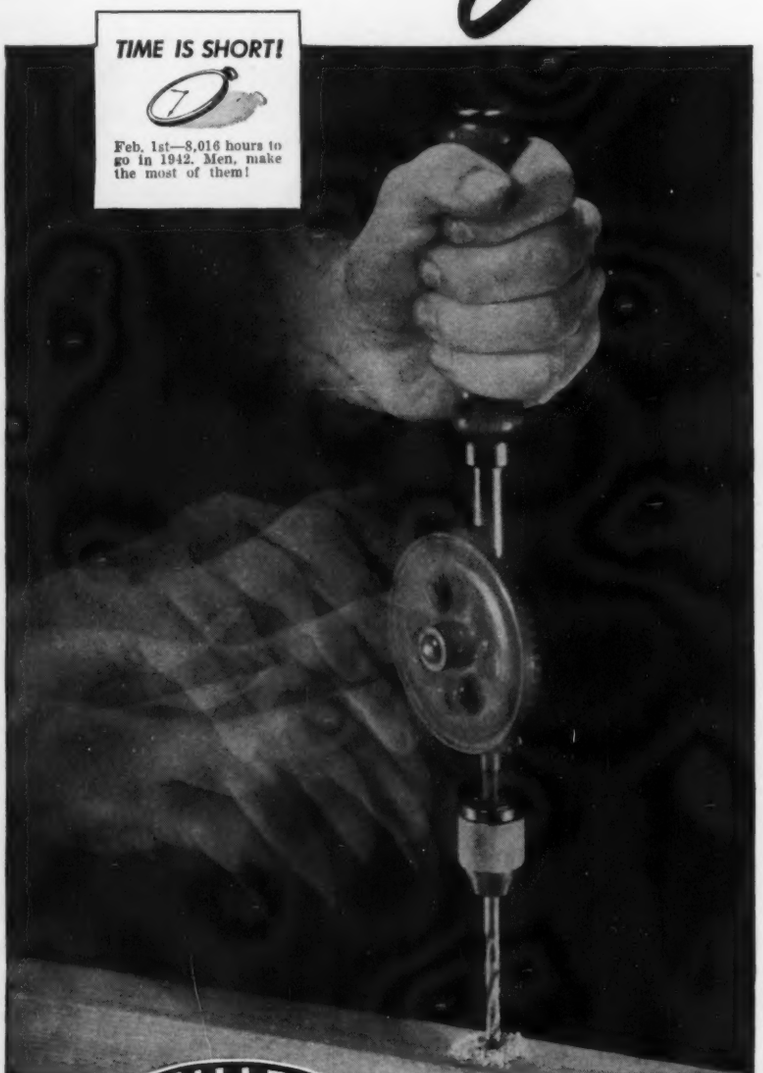
"We feel that this program of acquisition is not only necessary in this wartime emergency but is essential to the development of the maximum production capacity of the region. This is one activity which clearly fits in with the fundamental idea of coordinating and integrating the resources of the region for an all-out war effort and preserving the results of that integration and coordination for the purposes of peace, and doing so in a way which recognizes the rights of the public agencies and the basic provisions of the Bonneville Act."

● Pacific Gas and Electric Co. has reached no decision on the action to be taken following the FPC ruling that the Pit No. 5 project is subject to license under the terms of the federal water power act. Two courses are open—an appeal to the courts or application for a permit and license. In the meantime construction work on the $20,000,000 hydro development is proceeding, since the power is needed for war production prior to the availability of power from Shasta Dam.

● The Federal Power Commission on Jan. 10 granted a petition by the State of California for permission to intervene as a party in proceedings on the application of the State of Arizona for a preliminary permit for the proposed water power development of the Bridge Canyon site on the Colorado River. Hearing on the application was scheduled to begin Feb. 9 in Phoenix.

This victory emblem for the electrical industry has been devised by the James R. Kearney Corp. The KVA victory symbol has been made available in poster form and as stickers for line trucks and windshields. Utilities may order them from the Kearney factory in St. Louis, Mo.

What you can do to help busy hands work *faster!*



Multiflash photograph made especially for this advertisement by Paul Wing

A MILLER Continuous Wireway Fluorescent Lighting System in your customers' plants will minimize worker eye fatigue . . . increase production efficiency . . . speed war effort.

Here's a *proven* way to help your customers' employees work better, faster, more surely and with less eye fatigue. Recommend MILLER 50 FOOT CANDLER or 100 FOOT CANDLER for factory areas and MILLER TROFFERS in offices and drafting rooms—for 50 foot candles or better of working light.

Obviously, by helping them, you help America's homefront battle of production . . . *and you help yourself.*

Today's conditions demand greater resourcefulness than ever from utility lighting men. Adequate lighting is a vital "working tool." That's why you will find it useful to have complete working details of the MILLER Continuous Wireway Fluorescent Lighting System. Write today. *(Representatives in principal cities.)*

•

Be sure your customers get these 5 MILLER fluorescent lighting benefits

HIGHER ILLUMINATION . . . 50 to 100 foot candles—with uniform light distribution.

30 TO 50% LOWER INSTALLATION COSTS . . . Make war production dollars go further.

FASTER INSTALLATION . . . Steps up building schedules—plants get into production quicker.

SIMPLIFIED MAINTENANCE . . . Easty-to-clean, removable porcelain-enamel reflectors—save man-hours for production.

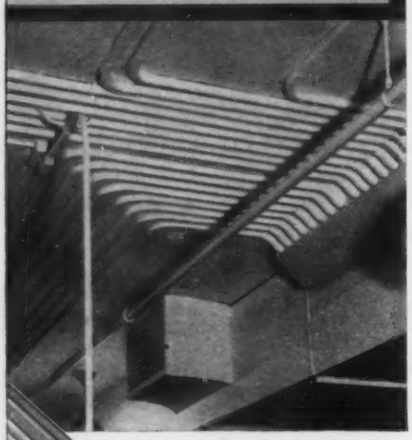
ALLOWANCE FOR FUTURE LIGHTING NEEDS . . . illumination can be increased 45% without new fixtures—lower obsolescence.

MILLER

50 FOOT CANDLER
100 FOOT CANDLER
MILLER TROFFERS
***Continuous* Wireway Fluorescent Lighting Systems**

THE MILLER COMPANY
MERIDEN, CONN.
Pioneers in Good Lighting Since 1844
• MILLER offers a complete line of filament and fluorescent lighting equipment

WHETHER YOU ARE
Wiring
OR
Rewiring



SEE OUR CATALOG IN SWEET'S

● SAVE TIME
● CONSERVE MATERIAL
● DO THE JOB FASTER

Wiremold Surface Metal Raceway Systems can be extended or relocated quickly, at low cost. New circuits can be added or changes made in the location of outlets, switches, etc. without breaking into plaster or "fishing" old conduits.

Strong, safe Wiremold Surface Metal Raceway is readily inspectable, less subject to unnoticed deterioration, completely protected. Wiremold Raceways meet all Code and Underwriters' requirements yet compact, thin-wall construction conserves steel. Catalog and Wiring Guide on request.

WIREMOLD
WIRING for LIGHT...LIGHTING for WORK
• CATALOGS and BULLETINS on request •
THE WIREMOLD COMPANY, HARTFORD, CONN.

FUNDS APPROPRIATED FOR BONNEVILLE IMPROVEMENTS

Last month Bonneville announced appropriations totalling $8,405,440 for additional transmission lines and substation improvements. Strengthening of the Grand Coulee-Covington network and additions to the Chehalis, Walla Walla and J. D. Ross substations are principal items covered.

Allocations of $2,319,400 and $3.-502.030 provide partially for two additional 230,000-volt circuits between Grand Coulee dam and Bonneville's Covington substation near Seattle. Four circuits, the first of which is now under construction, are contemplated between these points to link Grand Coulee and Bonneville dams and the Puget Sound and Portland-Vancouver industrial areas.

The second Grand Coulee-Covington line will be a 183-mi. single circuit steel tower line, using the same right-of-way as line No. 1. Total cost of this line will be approximately $4,500,000. Line No. 3, which will cost more than $9,000,000, will be a 185-mi. double-circuit steel tower line. Construction will begin, according to the announcement, as soon as steel is available.

Additions to the Walla Walla substation will provide for greater flexibility and security of service in the Walla Walla, Pendleton and Lewiston areas, according to the announcement, and will include a radio station to provide for dispatching power and directing patrol of transmission lines. Cost will be approximately $130,000, of which $118,200 has been authorized. Completion is scheduled for early in 1943.

At the Chehalis and Ross substations, improvements will provide added power capacity to meet needs now apparent and additional load expected to develop due to the war, it was announced. A total of $1,815,810 was allocated for this work, $280,540 for Chehalis substation and $1,535,270 for Ross substation.

Construction of a 115,000-volt transmission line from Spokane to Colfax is provided in an allocation of $650,000. This line will complete a power loop connecting Grand Coulee dam, Bonneville's Midway substation at Vernita, Wash. and substations at Walla Walla and Colfax and at Lewiston, Idaho, the announcement stated, and will supplement the two 115,000-volt lines now under construction between Grand Coulee and Spokane, where the government is building an aluminum plant.

Also announced during January was the approval of a 115,000-volt transmission line from Potlatch to Bremerton. The line will be about 33 mi. long and will cost approximately $450,000.

Answer to "Who Am I?"
See page 90.
William C. Mullendore

Electriquiz Answers

1. If windows are made light-tight, normal interior lighting may be used during a blackout.

2. Sun lamps are cheaper, according to the United States Department of Agriculture. The cost of cod liver oil per season for 100 birds is about 75c, as compared to approximately 37c for ultra-violet light.

3. Black light is being used to detect certain ores, to trace the course of underground streams and to show the presence of mouldy grain and potatoes not suitable for seed.

4. Fluorescent lighting goes back to Thomas A. Edison, who patented a fluorescent device in 1907. However, it took years of modern research to produce today's high efficiency lamps.

5. A 115-volt sun lamp that screws into any lighting outlet and has the reflector incorporated in the lamp.

6. Calif. Electric Power Co.

7. 20%.

8. Automobile accidents in this country. When 1941 figures are completed, they are expected to repeat this surprising comparison which dramatizes the need for better street lighting.

9. When it measures electric wire. No. 12 gauge wire is larger than No. 14 wire.

10. There is a No. 13 wire but it is not in general use. Maybe the people who decided the uses of the wire were superstitious.

V for our battle of production

Engineered -- Controlled

PERMAFLECTOR INDUSTRIAL LIGHTING

SAVES CRITICAL METALS FOR WAR NEEDS

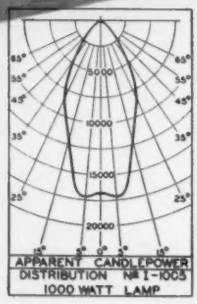
PROVIDES MORE LIGHT FOR PRODUCTIVE SEEING

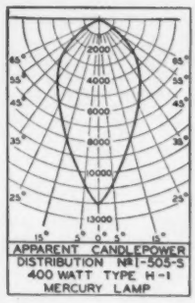
READY-TO-INSTALL UNITS PROMPTLY DELIVERED

SLASHES TIME OF INSTALLATION, MAINTENANCE

Permaflector—the silver mirrored glass reflector with the permanent efficiency

No. I-1005-B





Throughout Defense and now through War, Permaflectors do double duty by assuring industrial users the profitable benefits of utmost lighting efficiency and by saving critical metals for requirements of Victory.

No. I-505-S

MERCURY VAPOR and INCANDESCENT INDUSTRIAL LIGHTING

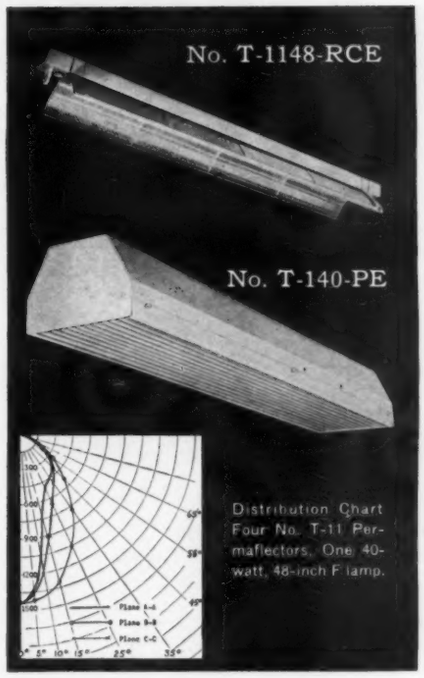
Permaflector No. I-1005-B is available immediately to any industrial plant in any quantity—is the perfect answer to efficient high bay plant lighting where unit is not subjected to severe vibration, shock or contact with moving objects—uses only a few ounces of metal—therefore requires no **Priority Rating Certificate**—can be installed quickly by attaching directly to conduit, stem hanger or nipple.

Permaflector No. I-505-S is equipped with a steel protective enclosure—concentrates light efficiently from mounting heights 25 feet or more—accommodates 500 or 300-watt incandescent lamps and the highly efficient 400-watt, Type H-1, mercury lamp.

PERMAFLECTOR FLUORESCENT INDUSTRIAL LIGHTING

High bay fluorescent lighting was recently made practicable by the introduction of silver mirrored glass Permaflector No. T-11 for use with F lamps. Permaflector No. T-11 provides new higher intensities at normal mounting heights and greatly extends the effective range of lighting with F lamps. Permaflector Combination No. T-1148-RCE consists of four Permaflectors No. T-11 and a skeleton metal holder for use therewith—attached to wired channel and quickly installed—accommodates one 40-watt, 48-inch F lamp—each unit saves several pounds of metal.

Permaflector Industrial Fluorescent Unit No. T-140-PE is equipped with a steel protective housing—uses one 40-watt, 48-inch F lamp—may be supplied with or without plastic enclosure—wired ready-to-install.



Distribution Chart Four No. T-11 Permaflectors, One 40-watt, 48-inch F lamp.

TIME-SAVING ENGINEERING SERVICE

Complete industrial lighting layouts and recommendations are available to industrial lighting users as a part of the Permaflector Engineering Service. Consult your nearest Permaflector Representative today or write direct to engineering headquarters in Pittsburgh.

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Permaflector Floodlights are available for exterior service to combat sabotage or provide high levels of illumination in work areas—Floodlight No. AL-10 Series for broad distribution—Floodlight No. AL-11 Series for intense concentration—for use with 1000-watt or 750-watt incandescent lamps.

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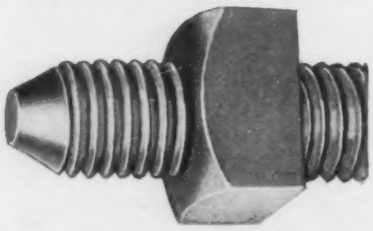

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"Handipoint" bolts save time and have greater salvage value—can be installed more quickly and removed from the hole without damaging threads. Made for all Kortick crossarm bolts, carriage bolts, eye bolts, guy rods.

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Lamp Replacers
Lamp Base Removers
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We have been making safety tools for 26 years

THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

$46,000,000 ALLOTTED FOR BONNEVILLE, GRAND COULEE

More than $46,000,000 is set aside for Bonneville and Grand Coulee dams in the budget submitted to Congress for the fiscal year starting July 1. President Roosevelt, in his budget message, stressed the importance of additional power needs in the Northwest.

An appropriation of $22,750,000 for Bonneville transmission lines is $30,000,000 under the 1941-42 figure, but it was indicated in dispatches from Washington that additional funds would be forthcoming if needed. Expenditure of $5,000,000 for substation construction is recommended and approximately $6,000,000 is allotted to the Coulee-Covington power ring.

Also recommended is an appropriation of $4,166,000 to complete installation of power machinery at Bonneville.

A total of $19,175,000 is earmarked for Grand Coulee. Of this $15,391,000 is for power plant construction and $2,000,000 for construction of a pumping plant and equalizer reservoir to pump water into the Coulee for reclamation purposes.

Utility Fined For Failure To Reclassify Accounts

A fine of $500—the first penalty of its kind ever imposed by the Utah Public Service Commission—was ordered by the commission to be paid by Uintah Power and Light Co. for failure to reclassify its accounts in accordance with a commission mandate.

On March 29, 1937, the commission issued a general order to all electric utilities to reclassify their accounts in accordance with the uniform system of the National Association of Railroad and Utilities Commissioners. The commission set forth that Uintah has failed to comply with the order in spite of repeated warnings.

Telluride Power Co. also was cited for asserted failure to comply with the order, but in this case the commission has not yet reached a decision.

● PROVIDING A RESERVE of trusted men to guard vital company property, an organization of approximately 50 volunteers has been built up from within the Portland General Electric Co.'s personnel. The men are all members of the Volunteer Guard and Patrol, a Portland organization numbering more than 6000, and have completed the intensive three-night course given members of the unit by the Portland Police Department. The idea of using company volunteers to supplement hired guards was suggested by an employee.

● NEW INSIGNIA have been adopted by Pacific Power & Light Co. for its trucks and service cars. Displaying the company name against an orange background, the insignia will enable immediate recognition of the vehicles and will be particularly helpful in case of emergency, according to company officials. All Pacific service cars and trucks carry first aid kits and fire extinguishers, they state.

● THE NEW MEXICO PUBLIC SERVICE COMMISSION has announced rate reductions totalling $28,300 a year at Taos, Alamogordo, Silver City and Lordsburg. Negotiations were with the New Mexico Public Service Co. at Taos and the Community Public Service Co. Domestic and commercial rates are affected.

● U. S. DISTRICT JUDGE JOHN BOWEN recently signed a decree declaring the contemplated taking by PUD No. 1. Snohomish County, Everett, Wash., of certain Puget Sound Power & Light Co. properties to be a public necessity and for a public use.

● REELECTION of all officers and appointment of a new secretary to replace the late Edward Martin was accomplished at the annual meeting of the San Francisco Electrical Contractors Assn., Inc., Jan. 22. George W. Abbett, Abbett Electric Co., continues as president; Wm. Weindorf, vice president; George Smith, treasurer. Edward W. Scott of Lynch & Scott Electric, became secretary. Scott was a director last year so this vacancy was filled by H. C. Wilson. Other directors reelected were: James Surtees, Twin Peaks Electric; C. C. Severin, J. Walter Spencer. C. L. Chamblin, California Electrical Construction Co.; Thomas Harris, H. S. Tittle Co.; and B. J. Doherty. Wm. J. Varley was reappointed by the board of directors as business representative.

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WHAT'S THAT? SOME KIND OF A NEW-FANGLED CAMERA?
NO-IT'S THE NEW G-E SELECTOMETER THAT LETS YOU CHOOSE FOR YOURSELF HOW MUCH LIGHT YOU NEED!
FOOTCANDLE SELECTOMETER

THE minute a lighting salesman walks into a factory or store with the new G-E Footcandle Selectometer, the prospect's interest is aroused. Of course! What man doesn't like to play with a clever new gadget?

And the Selectometer is more than a gadget. It's a device that lets the prospect's own eyes choose exactly the level of lighting he needs! There just isn't any better way to visualize the benefits of Better Light for Better Sight!

It's vital that you tell this story now! For Better Light can step up production—and the nation needs it!

For complete information, see your local G-E Lamp Division Office. How many can you use?

G-E MAZDA LAMPS

GENERAL ELECTRIC

Made to stay brighter longer

TRADE *notes*

● J. C. SETCHELL has been appointed a vice-president of Garnett Young & Co., manufacturers representatives, and will be in charge of sales in southern California and Arizona, with headquarters in Los Angeles. Mr. Setchell has been a member of the firm's sales organization for many years, for the past 10 as a district sales manager.

● HARTZELL PROPELLER FAN CO., Piqua, Ohio, has announced the appointment of Maydwell & Hartzell, Inc., as exclusive representatives in California, Oregon, Washington, Nevada and Arizona for its complete line of industrial centrifugal and axial fans.

● GRAYBAR ELECTRIC Co's Seattle office was host to the company's dealers throughout the Seattle-Tacoma area at a meeting held Jan. 19 at the Washington hotel. F. T. Brien, manager of the merchandising department, was in charge.

SOLVE VOLTAGE "HEADACHES"
with *Custom-Built Transformers*

Installed in a large San Francisco Bay Area oil refinery are these 13 Gardner Transformers, ranging in size from 200 KVA 2300 to 230/460 Volts, to 10 KVA 2300 to 230/115 Volts.

Overcome special voltage problems with Built-to-Order GARDNER Transformers. Individually built to meet YOUR operating conditions, they give dependable, economical performance.

Throughout the western United States more and more contractors are relying on GARDNER Transformers to answer particular voltage requirements. There's a reason why! Under the worst hazards —high temperatures—dangerous lightning storms—the name GARDNER is your guarantee of trouble-free operation.

Write TODAY for complete information.

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OUR NAME MAYDWELL SPELLS QUALITY

MAYDWELL & HARTZELL
INCORPORATED
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● COLUMBIA ELECTRIC & MFG. CO. of Spokane, of which Eric A. Johnston, also of the Brown Johnston Electric Co., is president, has purchased the Spokane Tool, Die and Machine Works. Walter A. Toly, production manager of Columbia Electric will be in charge. He announces that the present plant of the Spokane, Tool, Die and Machine Works will be continued, but later it is planned to expand at the location of Columbia Electric and move the recently purchased equipment there.

● TRICO FUSE MFG. CO. has announced the appointment of the following representatives: Pacific Industrial Products Co., Ninth and Harrison Sts., Oakland, for northern California; H. H. Van Luven, 307-309 E. Third St., Los Angeles, for southern California, Arizona and Nevada; Albert S. Knight Co., 3006 Western Ave., Seattle, for Washington, Oregon, northern Idaho and western Montana.

● THE ILG ELECTRIC VENTILATING CO., Chicago, Ill., announces that Charles E. Parks, formerly manager of its Pittsburgh branch office, has been transferred to Los Angeles as district manager of the Pacific Coast territory. Branch offices in Los Angeles, San Francisco, San Diego, Seattle, Salt Lake City, Phoenix and El Paso will be under his supervision.

● SYLVANIA PACIFIC CO., a division of Hygrade Sylvania Corp., has moved its headquarters from 1630 South Flower St. to 977 South Western Ave., Los Angeles, according to E. P. Demarest, Pacific coast manager. Demarest also announced the appointment of Lynne Stanley as northern California representative, with headquarters at 5657 Colton Blvd., Oakland.

● C. H. KAUFMAN AND ASSOCIATES, Los Angeles and Oakland manufacturers agents, have taken on the Niagara transformer line manufactured by Erie Electric Co., Inc., Buffalo. Their territory includes the entire west coast.

● H. S. EMANUELS of Seattle has been appointed Washington and Oregon representative of the John C. Dolph Co. He will carry a complete stock of standard Dolph varnishes in Seattle to expedite delivery.

● ACME ELECTRIC WELDER CO., Los Angeles, has completed construction on a new 18,000-sq. ft. factory for the production of welding equipment.

● AMCO MFG. CO., maker of electrical products, has moved from Los Angeles to its new building at 1622 Victory Blvd., Glendale, Calif.

THOMAS "QUIET-TYPE" INSULATORS

UTILITY EXECUTIVES — alert to the public demand for noise-free radio reception, are instructing their Engineers to install noise-free insulators on all new construction.

UTILITY ENGINEERS — after careful consideration of all methods of combating radio interference, are choosing Thomas "Quiet-Types" for permanent elimination of insulator radio-noise.

. . And here are the REASONS WHY!

● All Thomas "Quiet-Types"—Switch or Bus, Suspension-Strain, and Pin Types are guaranteed noise-free and each incorporates the Thomas patented "Under-Glaze Process."

● Combined with our under-glaze, noise-eliminating process, which is a definite plus value, the user of Thomas "Quiet-Types" gets an insulator of time-tested design whose performance is unexcelled for reliability.

● Noise-free characteristics of Thomas designs were so carefully developed they do not impair the insulator's desirable features as an insulator; and the Thomas "Under-Glaze Process" does not in any way harm the porcelain structure but maintains electrical, thermal, and mechanical characteristics at the highest degree of perfection.

● The slight additional cost over conventional type insulators is relatively speaking your best investment when customer goodwill is maintained by the quiet operation of your lines. Thomas "Quiet-Types" cost you no more than similar insulators—install them today for better service. They're backed by 68 years of manufacturing experience.

OUR LATEST CATALOG

complete with up-to-date designs, illustrations, and engineering information on all items, is yours for the asking. If not received write for your copy today. . . . .

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The Pioneer 1875

OUR 68TH YEAR

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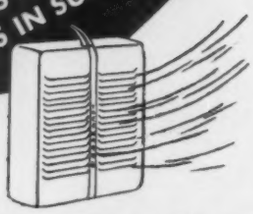
Fan-type Portable Heater
WARMS IN WINTER
COOLS IN SUMMER



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Watch efficiency and production soar when you install Thermador Portable Electric Heaters. Enclosed fan forces out comforting warmth or circulates refreshing, cooling air. Light, compact, portable, may be moved about plant or office with minimum of effort.

Equipped with four-position switch: cool, half heat, full heat, off. 8 feet of cord and polarity plug. 230 Volts —50 or 60 cycles A.C., Single Phase. Sizes to 5000 Watts. Write for prices and specifications.

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Advertising that is read with this thought in mind may provide the solution to a problem that has kept you awake nights.

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THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE

NOW—lower prices and higher capacities

There is a Tork Clock for every regular switching job; 60 minute, 4 hour or daily cycles.

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Felix Simon, P. O. Box 614 . . . . . Denver
H. Geo. Shefler, P. O. Box 1587 . . . Phoenix

PRIORITIES

In response to many requests, ELECTRICAL WEST will publish in this column monthly a summary of significant priority rulings and a bibliography of pertinent articles on the subject.

Procedure Simplified

Extension and assignment of individual preference ratings has been simplified and made more uniform by Priorities Regulation No. 3. After Feb. 2 individual preference ratings of the type which heretofore had been assigned on PD-1 and PD-3 forms could be extended to suppliers and subsuppliers by simple endorsement.

Two new forms of preference rating certificates, PD-1A and PD-3A have replaced the forms PD-1 to PD-5. Use of these became optional after Feb. 2 and will be mandatory after March 1. PD-1A is for applications for materials and supplies when general preference orders do not provide the necessary priority assistance. PD-3A applies to orders from government agencies and lend-lease.

● ADEQUATE STOCKS of electrical supplies will continue to be available to the public through usual wholesale and retail channels. Suppliers Order M-67 has been sent to all retailers, wholesalers and other distributors of electrical supplies to assure an equitable distribution of these items essential to public health and welfare. It establishes maximum inventory levels.

● USE OF CADMIUM for a long list of articles including a number in the electrical field was prohibited after Feb. 1 under Order M-65-a. Banned are uses of this metal on air conditioning equipment, conduits, lighting fixtures, portable heaters, washing machines and electrical fittings.

● CURTAILMENT ORDERS representing steps toward tightening restrictions in an effort to speed conversion of civilian industry to war output were issued during January. First quarter quotas for vacuum cleaners were set at 60 to 75% of factory sales in the base year ending June 30, 1940. A second ruling limited use of steel by ice box manufacturers to 60% of the monthly average in the base year..

Bibliography:

"Priorities"—an eight-page resume of the situation affecting power companies, manufacturers and distributors. *Electrical World*, Jan. 10, 1942, pp. 39-44.

"Strategic Table Aids Substitute Selection," *Product Engineering*, January 1942, p. 51.

PEOPLE
made this news

John B. Fisken Retires; Had Served 53 Years

John B. Fisken, Washington Water Power Co., safety engineer and an employee of the company since its founding in March, 1889, retired from active service Jan. 1, according to J. E. E. Royer, vice-president and general manager.

A native of Scotland, Fisken was graduated with honors from the College of

JOHN B. FISKEN

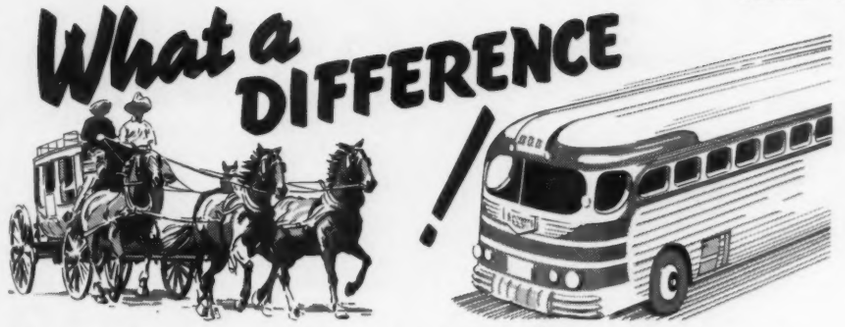
Arts and Science, Glasgow, in 1886. He migrated to Victoria, B. C., in 1887, and worked for the Victoria Electric Illuminating Co.

Fisken moved to Spokane, Wash., in 1887 and entered the employ of the Spokane Falls Electric Light & Power Co., forerunner of the Washington Water Power Co.

He served as W. W. P. Co. light and power superintendent from 1889 until 1918, when he became chief engineer. Two years later he was named consulting engineer and has served as safety engineer since February, 1939.

While working for the Spokane Falls Electric Light & Power Co. he designed and supervised the building of three power stations and later had charge of the electrical installation for the W. W. P. Co.'s Monroe Street power station in Spokane, which station is still in operation.

Fisken is a past president of the Northwest Electric Light and Power Assn. and a fellow of the American Institute of Electrical Engineers.



And there's just as much difference between the *streamlined* BRIEGEL METHOD of making connections and former old-fashioned methods.

The BRIEGEL METHOD saves you up to 50% on time and a substantial saving on materials, allowing you a larger margin of profit on each job. Make quick, easy, strong and neat connections this MODERN way.

No extra turns or twists, no nuts to tighten when you use B-M connectors and couplings. Just TWO SQUEEZES with the patented B-M indenter (which costs you only $1.25) and you have a smooth efficient job. Approved by Underwriters Laboratories.

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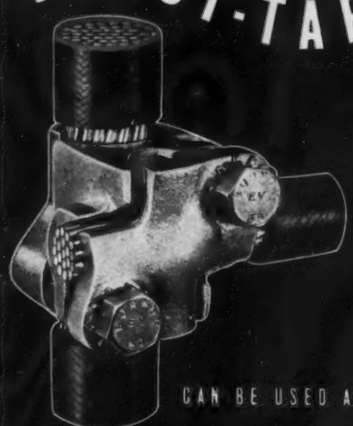

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TRANSFORMERS

—in the JEFFRIES line

Practically all your small transformer needs are supplied by the Complete Jeffries line. We have specialized for years in providing transformers to **exactly** match your requirements. If not in our regular line, we build to meet your specifications—in a hurry!!

Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles, Calif.

Promotions Announced By Telluride Power Company

H. B. Waters of Salt Lake City was elevated from president and general manager to president and chairman of the board of Telluride Power Co. at a recent meeting of company directors. Mr. Waters has been with the company about 25 years.

At the same meeting, Paul B. Ashworth, also a veteran employe and assistant manager of the company, was promoted to general manager. He will maintain operation headquarters at Richfield and Waters will continue in his office at Salt Lake City.

The promotions indicate no essential change in the company's operations setup, H. R. Waldo, secretary, said in announcing the appointments Jan. 17.

Telluride Power Co. produces and distributes electric power in San Pete, Sevier, Piute, Beaver, Millard and Garfield counties, Utah.

● James Eugene Barrett, 52, Madera district manager of Pacific Gas & Electric Co. since 1923, died December 7, following a major abdominal operation. A native of Kansas, Barrett started work with P. G. and E. in January, 1917. He left in October of the same year to serve in the World War and returned to the company in February, 1919. He was away again from April, 1921 to March, 1922, and in June, 1922, he was made assistant district manager at Fresno.

● Dietrick Wolters has been appointed chief electrical inspector at Salt Lake City by Fred Tedesco, the city's new commissioner in charge of the Bureau of Mechanical Inspection. Wolters has been engaged in the contracting business at Salt Lake City for the past 35 years. He replaces Blaine Grey, 1940 president of the Northwestern section of IAEI, who had held the position for eight years.

● Basil Manly has been named vice-chairman of the Federal Power Commission, succeeding Claude L. Draper, who had held the post for two years. Manly, in 1938, was vice chairman of the National Defense Power Committee which prepared a confidential report outlining power policies and requirements for a war period. A member of the commission since 1933, he previously was vice-chairman from 1933 to 1936.

● Charles E. Carey, chief consulting engineer of the Bonneville Power Administration, is leaving that position to become engineer in charge of power and sales of the Central Valley Project in California. Carey has been connected with the Bonneville administration since its inception, having been appointed to the position of chief engineer by the late J. D. Ross. Subsequently he was made chief consulting engineer. Prior to his service with Bonneville, he served as a consulting engineer in Seattle. He formerly was Pacific Northwest district engineer for the Westinghouse Electric & Manufacturing Co.

D. M. Trott Dies At Los Angeles

Daniel M. Trott, 61, vice-president in charge of finance for the Southern California Edison Co., died Jan. 17 at his home in Los Angeles following a heart attack.

Mr. Trott became a member of the

DANIEL M. TROTT

Edison organization in 1905, beginning as an accountant. He became traveling auditor two years later and in 1912 became statistician. He was appointed assistant comptroller in 1917 and three years later was made comptroller. He had been vice-president in charge of finance since 1930.

● Three Electrical Engineers were inducted as officers of the Engineers' Club of San Francisco at the annual meeting on January 15. J. W. Mahoney, General Electric Co., is treasurer for 1942. E. F. Maryatt, Pacific Gas and Electric Co., and W. C. Smith, General Electric, are serving on the board of directors. President of the club is L. A. Elsener, district manager of the Chicago Bridge & Iron Co.

● E. M. Lause, of Tacoma, Washington, has been named vice-president and general manager of the Washington Gas & Electric Co. in Tacoma succeeding T. E. Roach who recently became assistant to the president of the Pacific Power & Light Co. He has had 20 years of experience in the public utility field with the Williamson Electric Co., the Kansas Electric Power Co., the Southeastern Gas Co. and a number of subsidiary companies of the Ohio Service Holding Corp. For the past two years he has been a special representative of Loeb & Eames, Inc., operating gas and electric companies in the middle west.

● Lieut. Francis M. Falge is safe in Hawaii, his friends in the industry will be glad to learn. Formerly with the South Pacific division of the General Electric Co. Lamp Department, Los Angeles, Lieut. Falge was on duty with the United States Navy at the time of the Japanese attack on Pearl Harbor Dec. 7.

George Wills Retires After Long Service

George M. Wills retired January 1 as general superintendent of California Electric Power Co. after more than 18 years in the job.

Wills started as helper to the district manager at Goldfield in 1908, continuing in that capacity until 1913. He was away for three years and on his return was successively draftsman in the engineering department, a foreman and superintendent of insulator tests.

In 1920 he was made district superintendent and assistant general superintendent and, three years later, general superintendent. A farewell dinner for him on December 13 at the Victoria club in Riverside was attended by 150 company employees, officials and members of their families.

● C. H. Edman, Madera district power salesman of the San Joaquin Power division of PG and E, was instantly killed in an automobile accident on Dec. 29, 1941. He had been with the power company since 1924 and was a frequent contributor to Electrical West on rural electrification subjects.

● William Henry Showell, oldest active electrical contractor in Salt Lake City, died Jan. 13. Mr. Showell was sixty-one years of age and had been a prominent member in Salt Lake electrical circles for the past forty-four years.

● J. A. Kahn, Salt Lake district manager of the General Electric Supply Corp., is chairman of the American Red Cross war relief drive in that area.

WHAT'S A FEW PETTICOATS BETWEEN FRIENDS ?

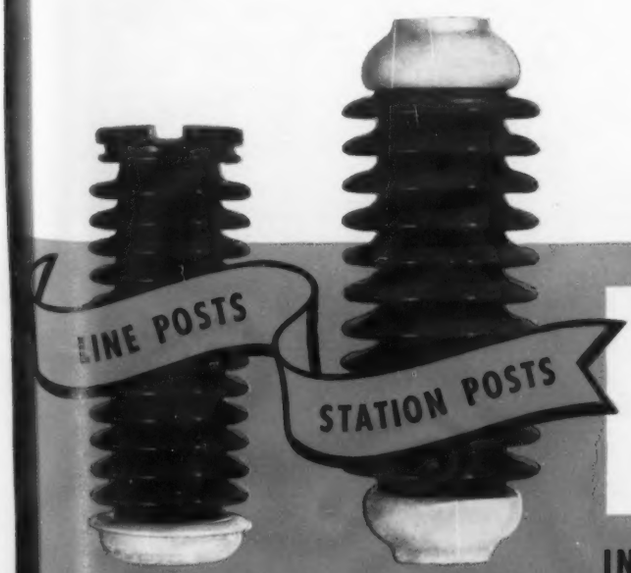
Shooting test for comparison. Conventional pin-type unit at left, received one bullet (.22 Long Rifle Super-X) from 50 feet. Body of upper shell is cracked. Loss in flashover distance is more than 35 %, in leakage distance more than 45 %. Complete failure of unit is imminent. Lapp Line Post porcelain, at right, received five .22 Long Rifle and one 25-20 Super-X bullets from 50 feet. Insulator is still sound mechanically and electrically. Flashover and leakage distance losses are negligible. This Post could safely remain in service indefinitely.

MAYBE you think there isn't much difference between Lapp Posts and conventional pin-type insulators. After all, the Post is just taller and slenderer, with more and shorter petticoats. The pin-type has nested porcelain shells, the Post a one-piece body. What's the difference?

Well, that's the difference that makes the difference in performance—the difference between systems that serve day and night and lines that go out at most inconvenient times—the difference between nearly-permanent insulation and continual, expensive insulator replacement.

It's a difference that can be noticed in just about everything that makes conventional insulators fail. In the matter of mechanical attack, for example. A well-placed stone or bullet can render a pin-type insulator helpless in a second; while a Post deflects it, or, at worst, having lost a petticoat or two, still has ample flashover and leakage distance to carry on its job. Similarly in the matter of power arcover. Post petticoats, shorter and sturdier, don't break off anything like as easily, or if they do break, don't impair the performance of the insulator. In operation under dirt conditions. Lapp Posts offer a *uniform* fog type leakage path, far more effective inch-for-inch; which means that even in areas of worst contamination, insulator cleaning is practically eliminated. In the matter of puncture—which comes when the current takes the short route from conductor to pin instead of flashing around—which can't happen to Lapp Posts because air flashover path is as short as internal puncture path. In the matter of cracking —which happens to conventional units when thermal expansion among nested parts causes bursting forces—which can't happen to Lapp Posts because all hardware is externally attached and the one-piece body can be loaded only in compression.

It's a difference that can be measured in years of service, in dollars of maintenance, and in hours of peaceful sleep. Maybe it's a difference you should investigate.



LAPP

INSULATOR CO., INC. • LEROY, N.Y., U.S.A.

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PROFILES *of the month*

Harry J. Martin, manufacturers' representative, Seattle, has been named Washington state director of OPM division of contract distribution.

W. H. Tangeman, with the Ontario, Calif., works of General Electric Co. since 1914, appointed its manager by Bridgeport official.

James McMahon (left), Graybar Electric Co., Los Angeles, won first prize in the 1941 Toastmaster campaign in which 6000 distributor salesmen competed. The prize was an Elgin wrist watch for Mrs. McMahon, who is shown receiving it from K. E. Campbell, Toastmaster district representative at a recent dinner attended by Graybar salesmen and officials and their wives.

Chief executives of interconnected Pacific Northwest utility systems who conferred in Portland Dec. 29 to review wartime responsibilities: LeRoy A. Grettum, Eastern Oregon Light & Power Co., Baker; Franklin T. Griffith, Portland General Electric Co.; Paul B. McKee, Pacific Power & Light Co., Portland; Frank Bird, Montana Power Co., Butte; K. M. Robinson, Washington Water Power Co., Spokane; Z. E. Merrill, Mountain States Power Co., Albany; A. S. Cummins, California Oregon Power Co., Medford; C. J. Strike, Idaho Power Co., Boise; James H. Polhemus, Portland General Electric Co., and L. T. Merwin, Northwestern Electric Co., Portland.

Preview of coming campaigns by

P·G·and E·

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

WARTIME LIGHTING VITAMIN COOKERY

P. G. and E. promotional advertising for February will point out how modern LIGHTING helps home morale during these stay-at-home days and nights, and how necessary it is **at all times** if we are to see clearly and easily and protect our eyesight.

Another advertisement this month will discuss new-style methods of COOKING that save vitamins and build up health and vitality—and will point out that a good range—**of modern design**—is an invaluable help in this kind of cooking.

Two more advertisements for February will feature portable electric heaters and automatic electric water heaters. These, however, will receive very limited publication.

For copies of these advertisements and a full schedule of dates, see your local newspaper.

FEB.
2—28

E.W. 102-242

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

It's Copper Sense

TWO ARTISTS are working side by side, painting the same scene. The work of one is superb, while the other is something less than mediocre. An onlooker asks the real artist what he uses to mix his paints and he replies, "brains."

In this present crisis it's an inspiration to see the results some men in the electrical industry have achieved already by mixing materials with brains—electrical contractors for instance. Some are already adjusted to OPM restrictions and are turning out noteworthy jobs with the same materials that the defeatist uses as an alibi for shoddy work.

This one who meets today's challenge with brains, studies regulations and knows just how much copper he is permitted to use on a given job. Then, with pride in his professional skill, he can make every inch of that wire and every switch and outlet do its job even on a copper diet.

There ARE ways and means of producing results in spite of limitations, but it requires mixing materials with brains. Utilities and industry associations are studying ways of obtaining the utmost from allowable wiring materials, and drawing from the experience and methods of successful contractors.

Your utility or local association will be glad to give you all the latest information as it develops.

Mix your materials, whatever they may be, with brains—a touch of imagination helps too—and then tell the world about it in advertising and publicity that will make your public remember your superior service when the "duration" is over.

PACIFIC COAST ELECTRICAL BUREAU

601 W. Fifth St., Los Angeles 447 Sutter St., San Francisco